ELECTRICAL TIMES

THURSDAY
23 JULY
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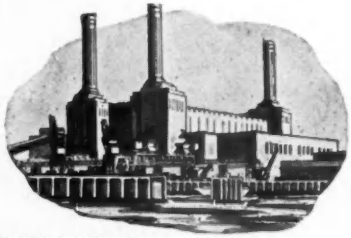
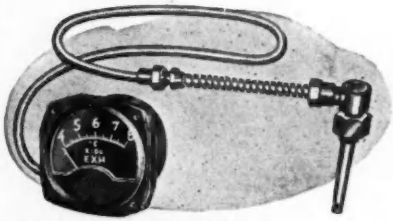
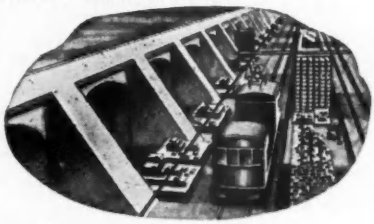


POWER STATIONS



AIRCRAFT THERMOCOUPLES



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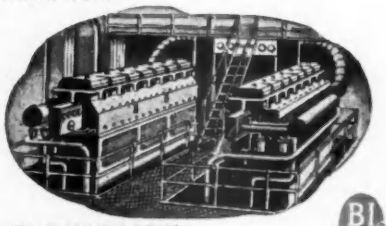

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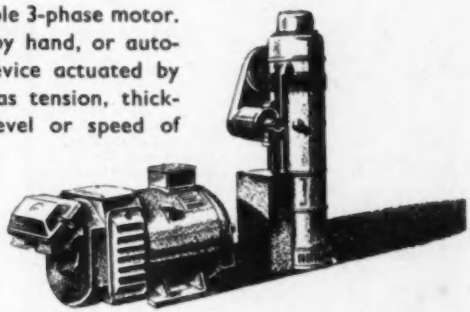

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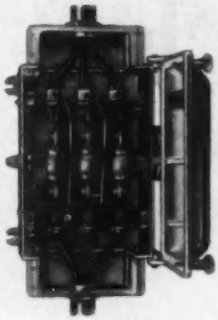

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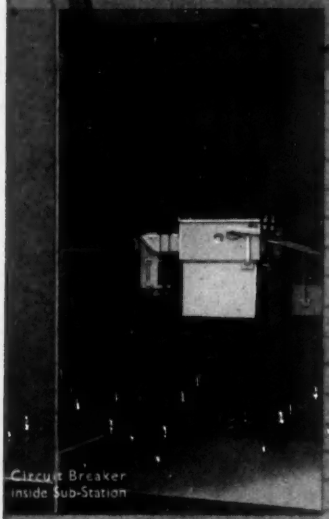

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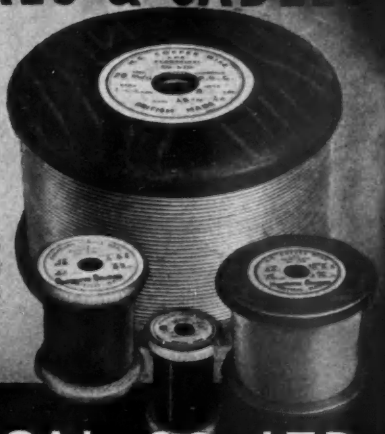

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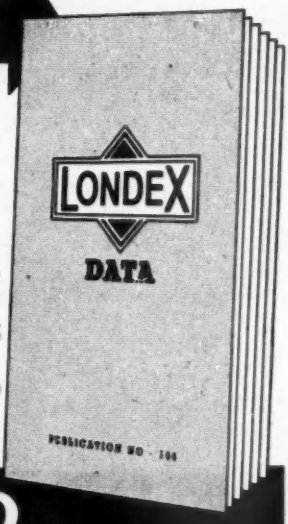

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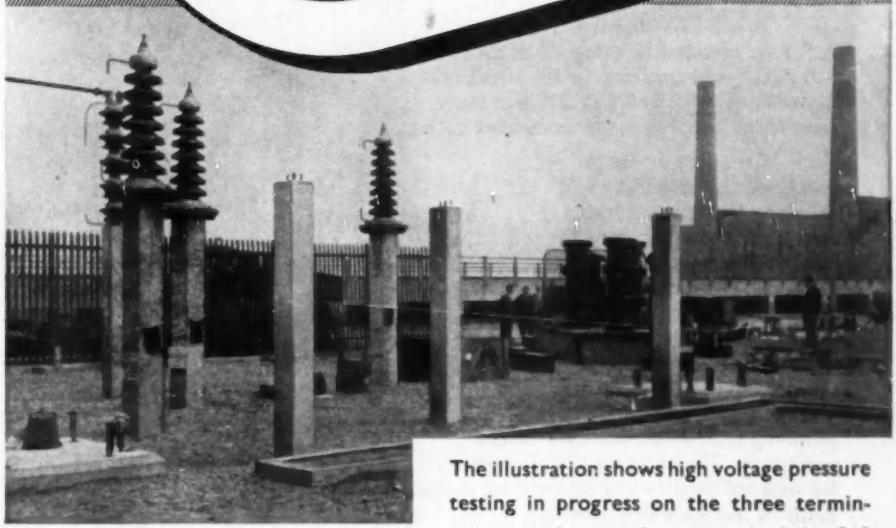

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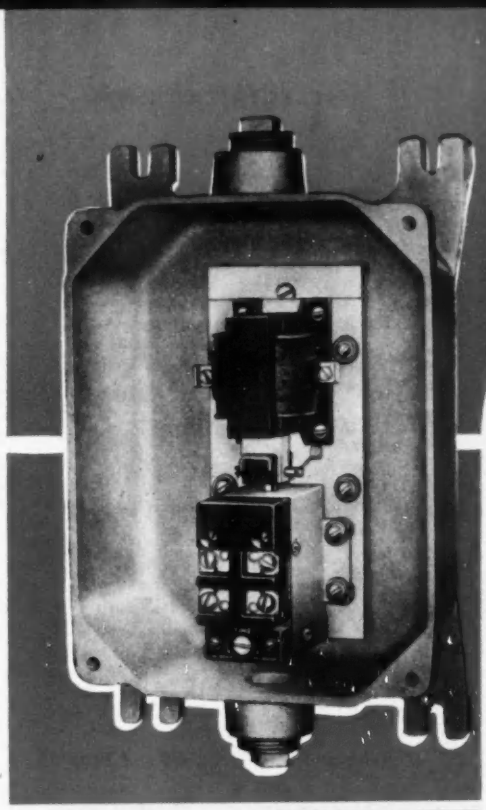

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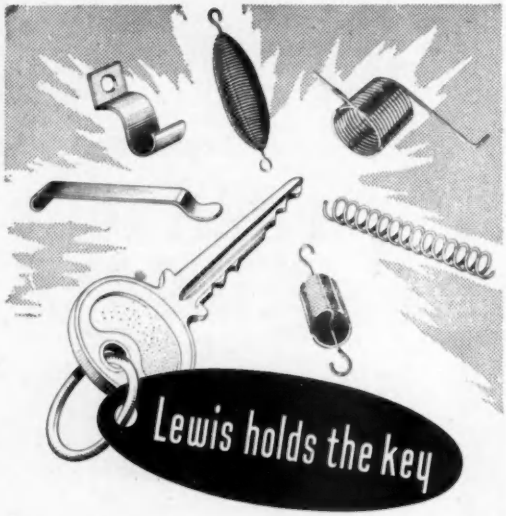

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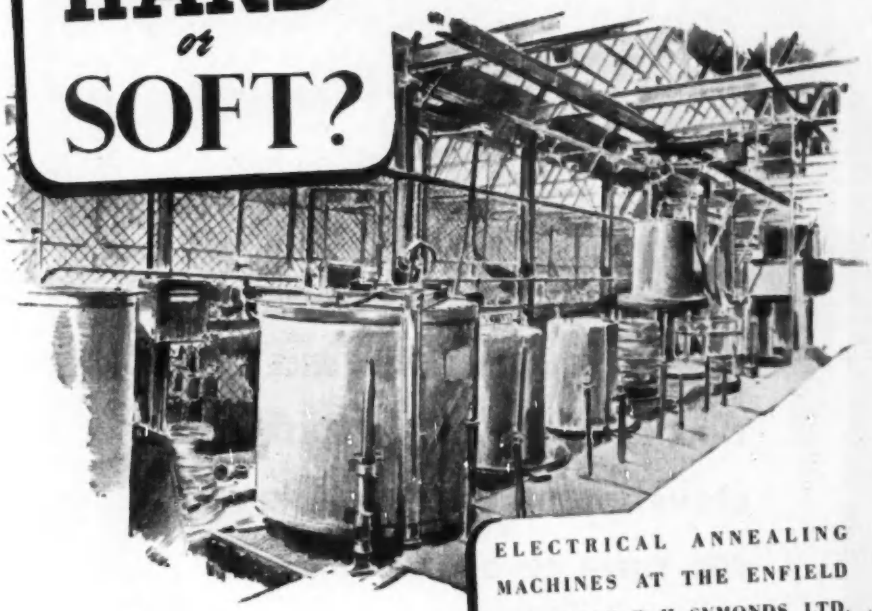

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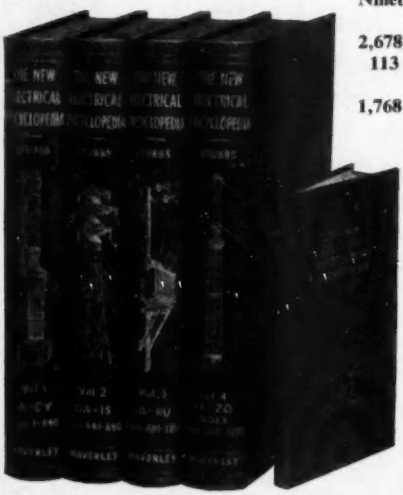

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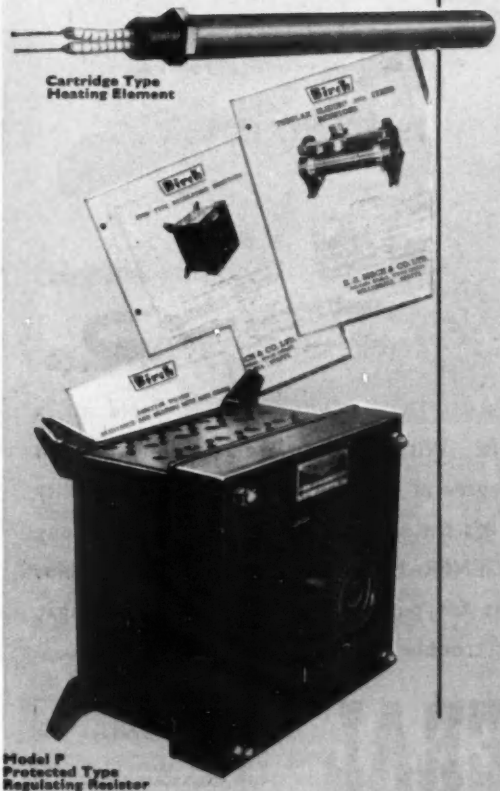

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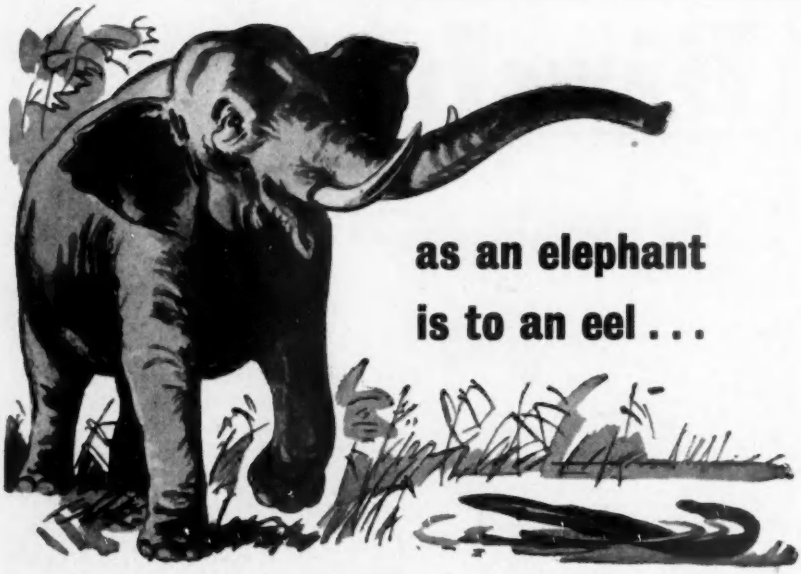

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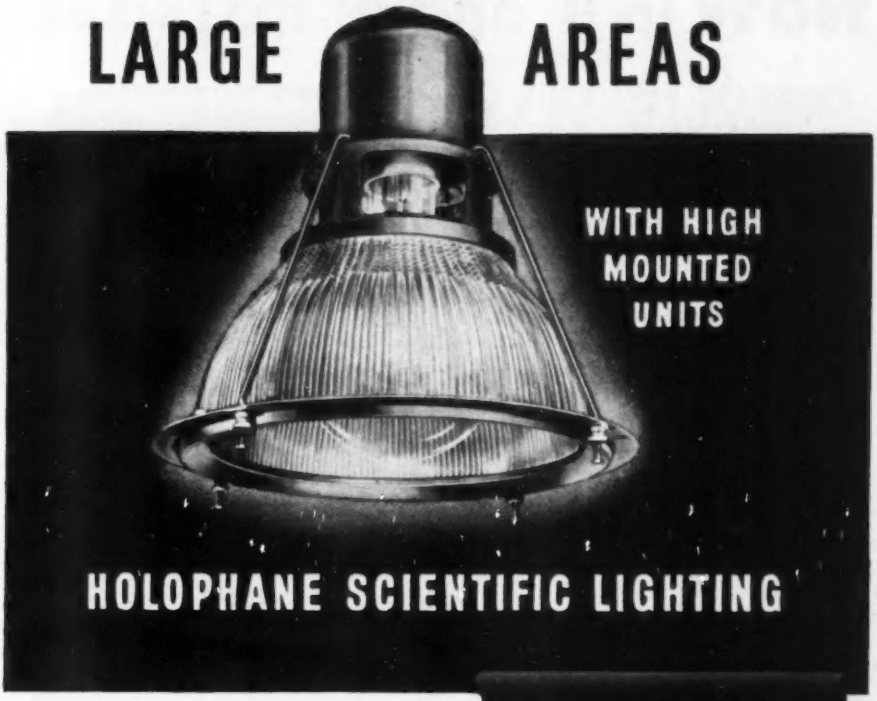

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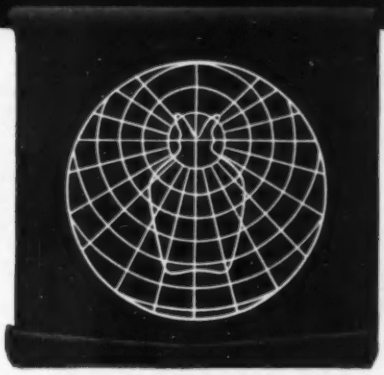

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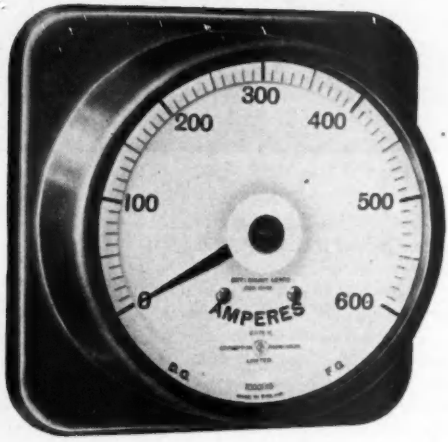

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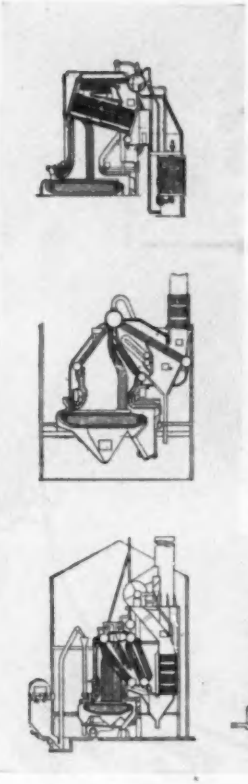

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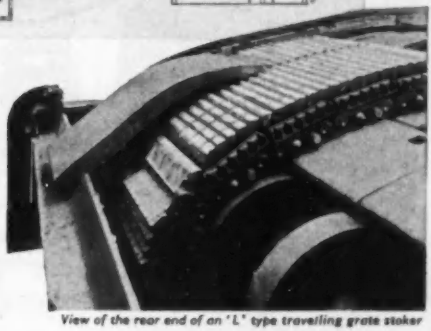

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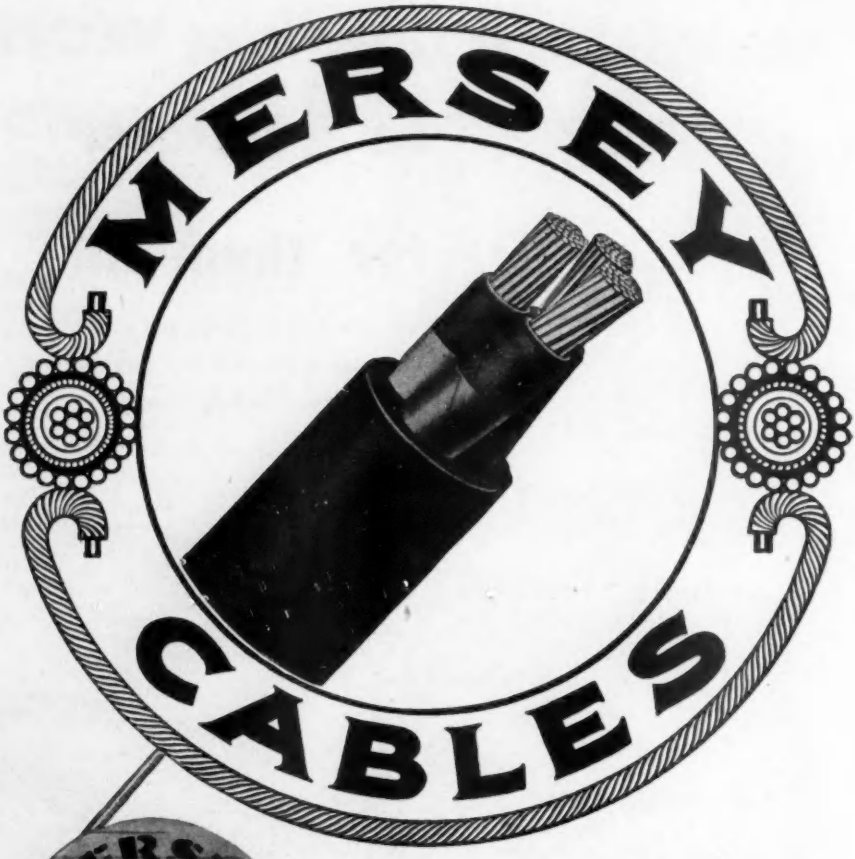

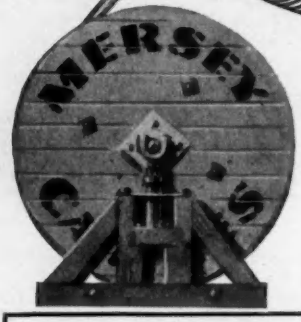

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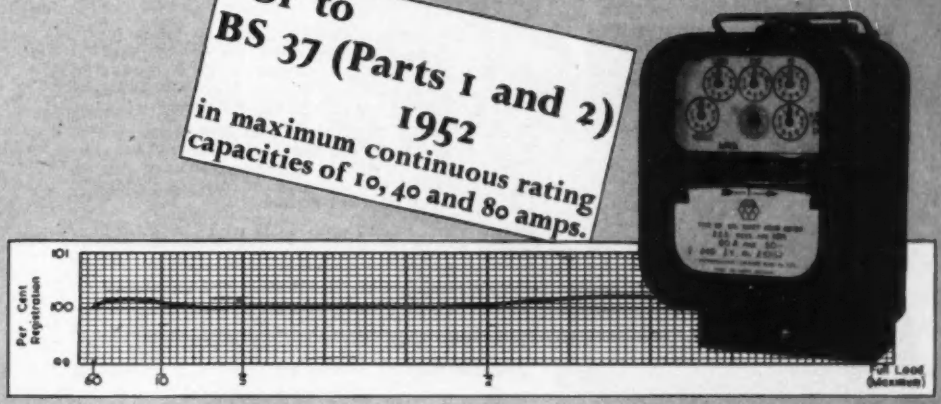
Available either to BS 37—1937 in long range capacities of $2\frac{1}{2}$, 5, 10, 25 and 50 amps.

Or to BS 37 (Parts 1 and 2) 1952 in maximum continuous rating capacities of 10, 40 and 80 amps.



In designing the Type NF meter Metrovick engineers anticipated the requirements of the 1952 specification, consequently the two patterns are fundamentally similar.

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METROVICK *equipment for meticulous metering*

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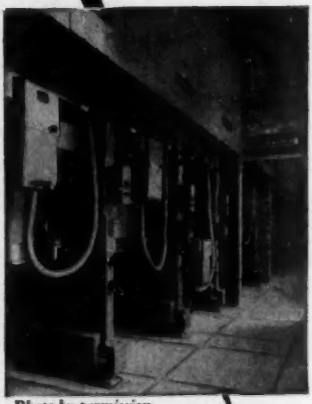
Heavy Duty Switchgear

Ferguson Pailin Heavy Duty Switchgear in which NOMAG castings are used



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To prevent overheating by hysteresis losses in covers, supports, etc., of heavy duty switchgear, leading manufacturers, among them Ferguson Pailin, Ltd., specify Ferranti NOMAG non-magnetic castings as a standard requirement.

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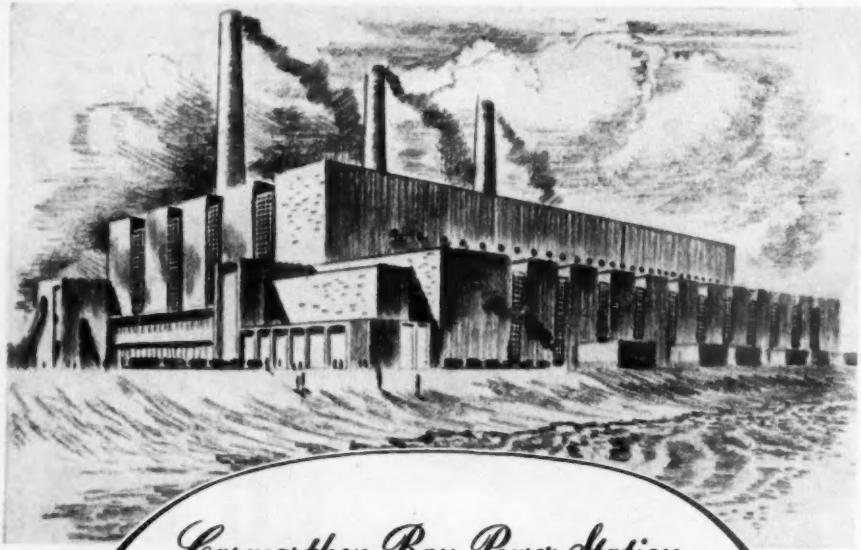

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This 'ere danged electricity frightens Oi, creepin' about all silent like. Taint natural! Never know where it's coming out of next. Young Tweezle from electric shop says Don't you fret, Granfer. I'll fix MK switches and you'll be safe as if P.C. Badger were on guard. You won't get no volts a-coming out after you, nor no amps neither.

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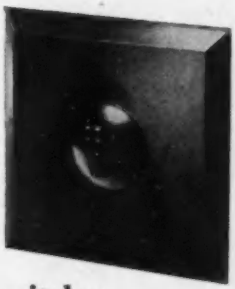

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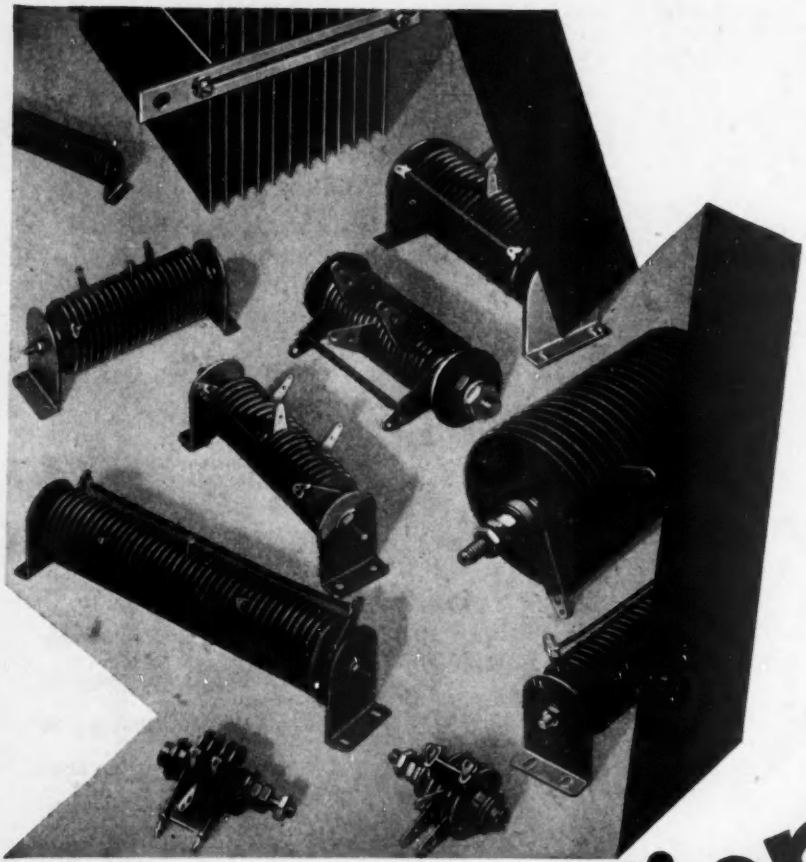

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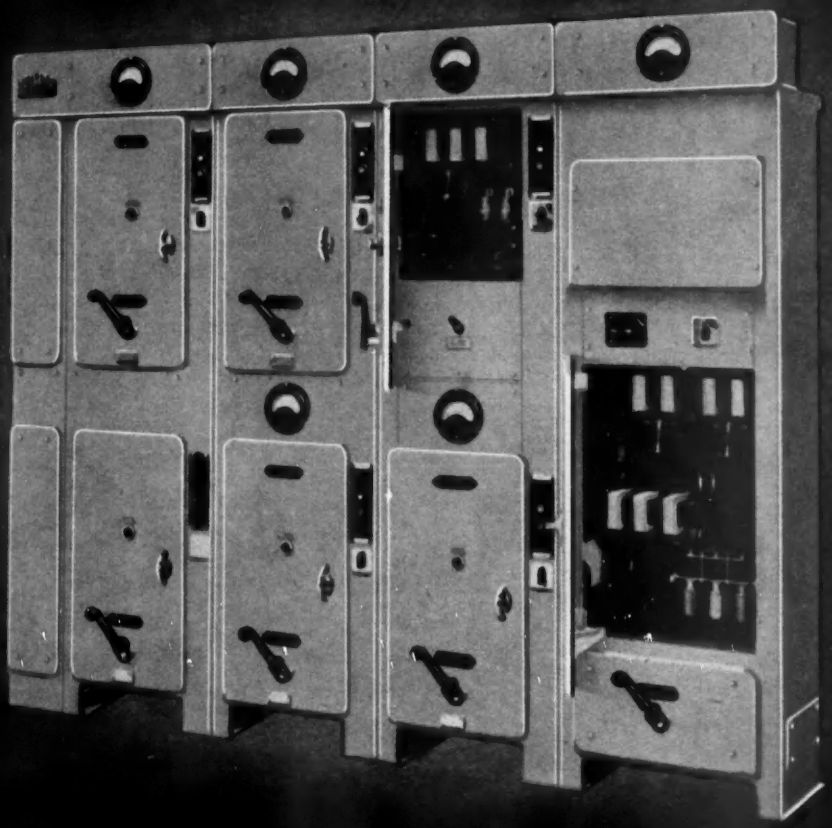

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Saves hours of fixing time . . .

with a revolutionary and practical design which allows simple aligning and positioning, irrespective of the depth of the box in the wall. No packing is needed behind the switch, which is incorporated within the grid as a composite unit, fixed intact on to the box, but resting on the wall or tiles. Hence depth of box within wall is immaterial.

. . . and costs even less than a surface switch

The plate (brown or white moulded Bakelite) is perfectly smooth and cannot collect dust.

Obtainable in one or two gang, one or two way. Two gang is vertical mounting.

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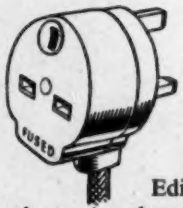

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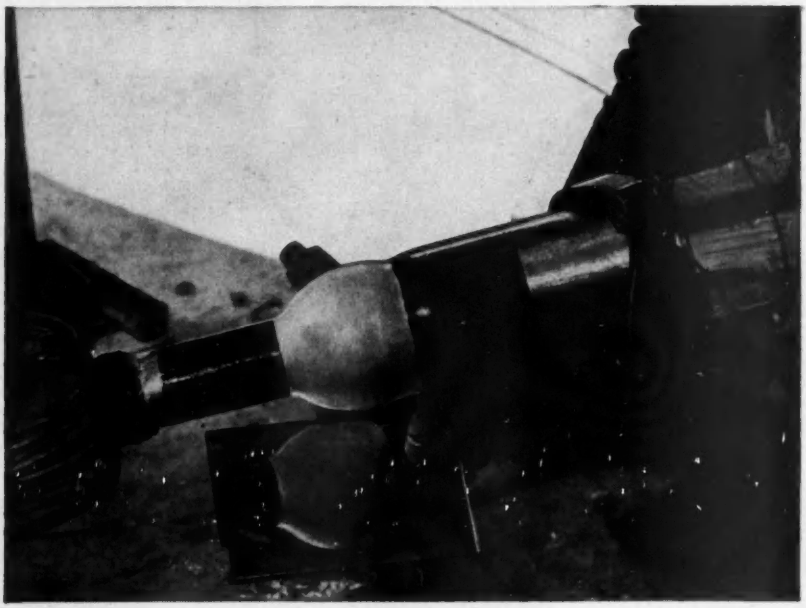

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Inspecting a finished wipe on an 0.25 sq. in. 33 K.V. cable.

Fry's Abbey solder results in the perfect joint shown above. Note the close grain and absolute freedom from pinholes.

Our Technical Publication No. 1 "Solders and Fluxes" and No. 3 dealing with Fluxes for electrical work will gladly be sent on request. FRY'S Supply Solders and Fluxes for every type of soldering in electrical work and the research of our Technical Department extends to every refinement of method. If you have a special problem we will be happy to advise.

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ELECTRICAL TIMES

Volume 124 No. 3220 23 JULY, 1953

PUBLISHED EVERY THURSDAY

275KV—THE FIRST LINK	143
CATENARY WIRING TO OUTBUILDINGS, by J. Mellanby M.A., A.M.I.E.E., M.Inst.F.	149
YUGOSLAVIA TO EXPORT POWER	150
OUR READERS' VIEWS	151
RADIO RESEARCH LAST YEAR	152
AUTOMATIC CONTROL OF LARGE GENERATORS	153
PEAT-BURNING TURBINES FOR THE HIGHLANDS	154
INDOOR HIGH-VOLTAGE SWITCHGEAR	155
MINING CABLE REGULATIONS	156
NOTES ON WIRING, by Megohm	157
DIESEL ELECTRIC TRACTION	158
POWER SUPPLY IN JUNE	160
PROBLEMS AND PRACTICE IN ENGINEERING	162
PUNCTURES IN PORCELAIN INSULATORS	163
OVERSEAS NEWS	164
PERSONALITIES IN THE INDUSTRY	166
NEW LITERATURE	168
EXPORTS AND IMPORTS	169
THE BUYER'S COLUMN	170
ELECTRICAL TESTING OF CONCRETE MIX	172
I.E.S. MEET AT NOTTINGHAM	173
THE WEEK IN NEWS	174
Questions in Parliament	179
Electric Supply News	180
Company Activities	181
COMMERCIAL INFORMATION	182
CLASSIFIED ADVERTISEMENTS	45
INDEX TO ADVERTISERS	52

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Editorial

ACTION FOR PUBLICITY

IN a recent survey of British industry published by a daily newspaper, it is remarkable that an article dealing with the subject of power supplies should have been written by one who is recognised as an advocate of solid fuel. It may be easy to explain this as no more than an unfortunate choice by the editor of the paper, but basically it is the industry's task to see that appropriate spokesmen are available for all such occasions and that their ability to speak authoritatively is widely recognised so as to avoid such undesirable occurrences. Whose task is it to see that the case for electricity is properly stated on all suitable occasions—E.D.A., the B.E.A., or B.E.A.M.A.? Any one of these organisations would undoubtedly have responded if they had been approached, but such static ideas on publicity are not enough. What is needed is a dynamic attitude to all such matters. It is becoming clear that the whole industry must combine in this task, manufacturers and the supply industry have a like interest in the promotion of electricity, even though there be a difference of accent between the two. Such a unity of purpose must not be just a matter of combining financial resources, it must provide an organisation of greater authority than heretofore, one that is capable of directing its component sections rather than accepting direction from them. Such a possibility is within reasonable grasp, for already there is in existence a top level committee formed from manufacturing and supply interests to co-ordinate publicity. Unfortunately the work of this committee appears to be as equally obscure as its results. What we require is not just another committee but a living organism that will provide the necessary power to the electrical publicity elbow.

PUTTING PEAT TO WORK

THE announcement by the Secretary of State for Scotland that a 2 MW closed-cycle peat-fired gas turbine plant is to be installed by the North of Scotland Hydro-Electric Board, marks a further development in the supply to rural areas. The gas turbine is, of course, particularly suited for this task as it possesses the virtues of lightness, enabling it to be transported to site with comparative ease, while the exhaust is at a temperature adequate to permit drying of the fuel before it is fed into the combustion chamber. With the development of "fluidising"—a technique whereby finely-ground peat and pressure air can be combined in such a way as to act as a liquid—the major problem of handling the fuel has been solved. The way has thus been opened to the economic exploitation of the considerable quantities of peat existing in the British Isles. And at the same time with the removal of the peat overburden land hitherto unfertile may be reclaimed for agricultural purposes.

PROVING CABLES

THE inauguration of the first section of the 275 kV Supergrid is undoubtedly a milestone in the history of electrical development in this country; but the primary reason for its existence, that of rationalisation and bulk distribution should not be allowed to overshadow completely the other advantages which it will bring. Not the least of these is the provision of a proving ground for high voltage cables. The present cable testing station located at Staythorpe is admittedly restricted in scope due to the low capacity of the Staythorpe-West Melton line, but the alacrity with which some cable makers have accepted the facilities available leaves no doubt that they consider field testing at

this voltage of primary importance. In fact, cables of larger current carrying capacity than that of the line itself are being tested, the thermal losses being made equivalent to those which will be experienced on the heavier sections of the 275 kV network. This is achieved by such methods as reducing the current carrying area of the cable or by making the conductors of a higher resistance material. At the same time it is possible to test the associated joints and terminations.

TRADE WITH CANADA

IT was early in 1949 that attention was first drawn to the importance of Canadian trade in achieving a dollar balance between the two countries, with a visit of an engineering mission to Canada. It was at that time also that the ELECTRICAL TIMES produced a special issue aimed at stimulating electrical trading with Canada. In the past four years great progress has been made in building closer business ties. Full Government support has been given to trading projects between the two countries, facilities have been provided for testing equipment in this country to Canadian standards and there has been set up a Canadian Association of British Manufacturers and Agencies which operates trade centres in the principal Canadian cities. Now a further step has been taken in the publication of an officially sponsored directory of British manufacturers and their products, together with particulars of their channels of trade in Canada. This provides a most necessary source of information if business connections are to be maintained and to increase, and we are happy to see this continuing development in a sales drive which has been our policy to foster from the first.

RETAILING IN U.S.

THE sales of electrical appliances in U.S. continue to rise and such increases as 52% for cookers and 37% for refrigerators are reported by manufacturers for the first four months of this year compared with 1952. But it would seem, nevertheless, that not all is well in the retailing field, for competition is reaching cut-throat limits. Not only are all the tricks of high pressure selling being exploited, with offers of free maintenance or home trials to convince prospective customers, but the slashing of prices appears to be in full swing. According to certain reports, three-quarters of retail sales are completed at less than list prices, and in some cases sales are at only a few per cent above cost. One of the contributory factors has been a rapid increase in employee associations which sell to their members at trade terms, while the retailer's showroom is often used to select the particular appliance it is wished to buy through such channels. There are no signs yet of a halt being called to this snowball of discount cutting, but the sharp rise that has occurred in the bankruptcy rate in this field may eventually provide its own corrective.

WAVES IN THE WIND

WIND and rain in former days exercised a disrupting effect on communications whenever either became excessive. Roads were rendered impassable and ships forced to lie to, and in later times telephone and telegraph wires were sometimes blown down. Today, the development of radio links has largely removed this mastery of the weather, and however severe the storm—so long as it is not electric—the message can usually get through. Yet, as shown in the current report of D.S.I.R.'s Director of Radio Research, today's freedom from weather trouble is perhaps on the wane. As increasingly intense use of radio methods brings ever higher frequencies into use over greater distances, the problems of the wind and the rain grow again in prominence. At distances of several hundred miles from a transmitter, radio field strengths at v.h.f. become increasingly dependent upon the scattering of energy caused by turbulent eddies in the lower atmosphere, while humidity also has a marked effect. In spite of all our technical advances, knowledge of the weather is still an important concern of experts in radio communication.

Meteor

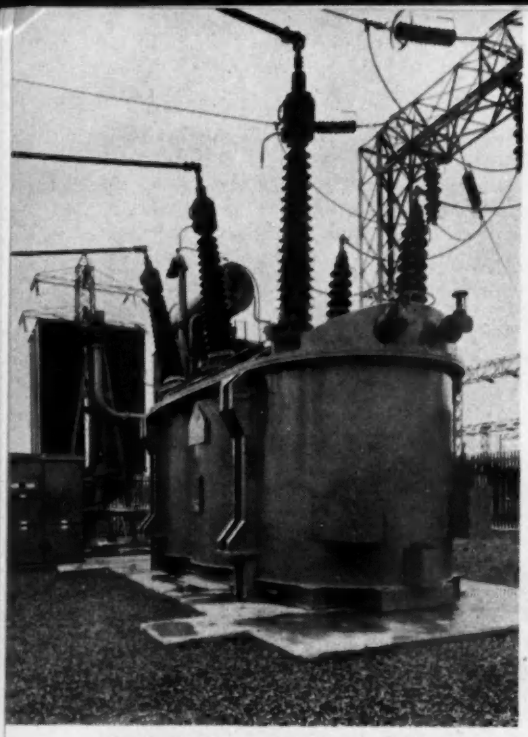
WHEN Sir John Hacking formally made alive the first section of the 275 kV Supergrid, an historic step was taken in the development of power transmission in this country.

The object of this superimposed system is not only to reinforce the heavily loaded 132 kV grid, but also to provide bulk supplies of power from the rapidly expanding East Midlands coalfields to the heavy industrial areas. The coal mined in this area is not of particularly good quality, and while suitable for burning in power stations and by certain well-equipped industrial plants is not of a high enough grade for export or for steam coal for bunkering. Nor is it of the type which is generally required for coking or gas production. One of the primary functions of the scheme, therefore, is to provide an economic outlet from the power stations which are built or are to be built in the Trent Valley, now becoming locally known as "bus-bar alley."

The accompanying map shows the extent of the scheme as at present constituted. The main features comprise a central ring of lines embracing the Midlands, Lancashire and the West Riding of Yorkshire with a connection running northward through Newcastle (Stella) to Carlisle and terminating at Glasgow (Clydes Mill). Southward from the ring run three connectors. One from Staythorpe to Elstree, which feeds a horseshoe loop running round London from Tilbury to Northfleet, one from Castle Donington, also connecting with the London loop at Iver, and one to the West Country from Drakelow, via Hams Hall, Melksham and Bristol to Uskmouth.

The conductors for these lines will be of steel-cored aluminium and of two sizes: 0·175 sq in. and 0·4 sq in. equivalent copper section. The smaller size will be used for interconnection and the larger for bulk transmission. Two conductors are used per phase with a spacing of 12 in. This design minimises corona losses. Compared with the original 132 kV lines with their thermal rating of 90 MVA per circuit, the 275 kV lines with 0·175 sq in. conductors will have a rating of 375 MVA per circuit and with 0·4 sq in. conductors 570 MVA per circuit.

Towers for the double circuit Supergrid are similar in appearance to the well-known 132 kV towers except of course for the necessary increased clearances. Two designs have been adopted, one for twin 0·175 sq in. conductors with a basic span of 1,000 ft, and the other for the 0·4 sq in. conductors with a basic span of 1,200 ft. The Staythorpe-West Melton line, however, which was erected as a trial section uses a rather different design as shown in the photographs. This is incidentally a single circuit line and has 0·175 sq in. (e.c.) conductors. Connection between the 132 and 275 kV



The English Electric transformer at West Melton

systems will be by auto-transformers, and when the project was first mooted, sizes of 120, 180 and 240 MVA were envisaged. So far however, all the transformers ordered are of 120 MVA, a size dictated by the restriction of transport weight on the British roads to a maximum of 150 tons inclusive of the transport vehicle.

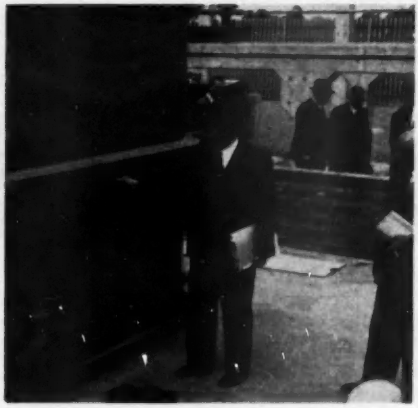
The 120 MVA transformers are 3 phase units designed for operation with the neutral solidly earthed, and to avoid the high cost of separate series connected voltage regulators, they are fitted with on-load tap changing equipment. Lower voltage windings, delta-connected with one terminal earthed, are also included.

As it is the intention at a later stage of development to connect a number of generating sets directly to the 275 kV system, it will be necessary to provide double wound transformers of not less than 120 MVA capacity with the lower voltage winding arranged for direct connection to the generator.

At a number of points, mainly on spur lines to power stations, the 275 kV switchgear will consist of isolators only, but elsewhere on the system 275 kV circuit-breakers will be required. These will be of two types, bulk oil and air blast. All breakers will however, have a short circuit rating of 7,500 MVA, achieved by the provision of four breaks in series per phase shunted by linear resistances in the bulk oil pattern, and by six interrupter heads per phase in the air blast units. Thermal ratings will of course correspond with the overhead line ratings of 800 amps and 1,200 amps. Provision is also to be made for the future application of high-speed auto-reclosing on the system.

Staythorpe-West Melton

The Staythorpe-West Melton line was erected in advance of the main system to provide operational experience at 275 kV, and is thus not truly representative of the system as a whole. It is the only Supergrid line of single



Sir John Hacking "unveils" a commemoration plaque on the Staythorpe transformer

circuit construction and has three twin conductors of 0·175 sq in. equivalent copper section, arranged in horizontal formation at 32 ft 6 in. spacing. Two earth wires are used. At the moment the line is connected to the 132 kV system through 120 MVA transformers at each end, switching being carried out on the 132 kV side. A 275 kV switching station, will however, be required, both at Staythorpe and West Melton and these two are programmed for commissioning in 1955.

Isolators

As mentioned above, 275 kV isolators are used at many positions on the system, and this is so on the Staythorpe-West Melton line. The design adopted is the type BEA 300 unit, to a common pattern developed by the English Eletric Co., General Electric Co. and Ferguson Pailin Ltd., and is the result of steps taken to standardise 275 kV switchgear.

It consists of two contra-rotational, 8-unit insulator stacks per phase, which, at the top end support sphere and spade high pressure

4-point contacts, and at the bottom end are mounted on footstep bearings with taper roller races built into heavy section channel iron bases. Line connections are fitted to the contact heads, so constructed as to allow the latter to rotate while the line connectors are held stationary.

The three phases are mechanically coupled to each other and to a motor driven hydraulic operating mechanism.

Above is a schematic of the 275 kV grid. Below, left, Mr. L. F. Jeffrey addresses the gathering, and, on right, Sir John Hacking (an "authorised person") completes the operation of switching in the line by notifying Birmingham Control

The mechanism comprises a motor-driven gear pump supplying both ends of a double-acting cylinder, the piston of which has a rack cut into the centre part of its length. The rack drives a pinion which rotates an output shaft to control the isolator.

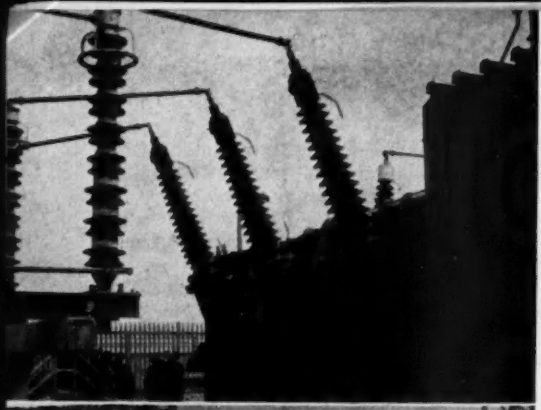
The complete mechanism, including the safety valves and non-return pick-up valves, is immersed in an oil bath, the driving motor being located on the top plate of the latter. Arrangements are made for local and remote electrical control and position indication with automatic cut-off at each end of the stroke, and also for emergency hand operation. Operational and mechanical interlocks are fitted to work in conjunction with associated circuit-breakers and earth switches and a thermal overload device protects the driving motor.

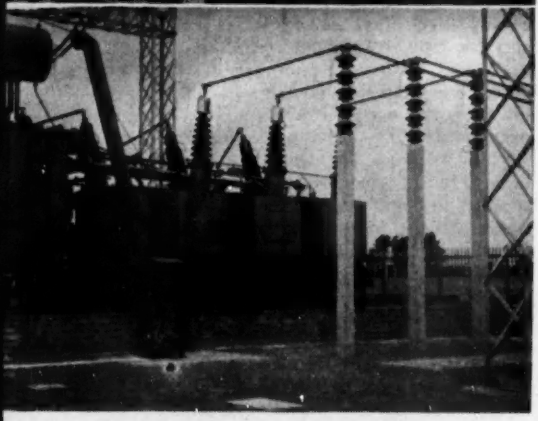
The earth switches, which can be fitted to both sides of the isolator are ganged and coupled to hand-operated mechanism boxes which are also mechanically interlocked with the associated isolators.

Both main and earth contacts are designed to carry a through short circuit current of 15,750 amps, corresponding to 7,500 MVA (the normal current rating being 1,200 amps). The actual isolators seen at Staythorpe and West Melton were of Ferguson Pailin manufacture who have a considerable number of these equipments in hand for the Supergrid.

Switchgear

At West Melton, a 275 kV 7,500 MVA air-blast circuit-breaker is being installed. Of English Electric manufacture this unit consists of three identical single-pole units coupled together electrically and pneumatically. Each single unit has six identical interrupters connected electrically in series and mounted in





Two views of the B.T.H. transformer at Staythorpe. Above is the 275 kV side and below the 132 kV side

two vertical columns, each being carried on a supporting structure of porcelain insulators in a triangular formation. The interrupters are of the axial blast pattern, shunted by porcelain-clad non-linear resistances or surge diverters. The two columns are connected electrically by double make-switch blades operated from air engines in the mechanism housing An air jet is also provided through the blades for ice-breaking purposes.

The local air receivers are mounted at the base of the support columns adjacent to the weatherproof cabinets which house the blast valves, control valves, anti-hunting relay and mechanically-driven auxiliary switches. Compressed air is carried from the base to the interrupters and make-switch operating air engines via the support insulators. A weatherproof galvanised steel cabinet is supplied with each breaker and contains equipment for local control of the breaker, the marshalling of multicore cables and the valves, etc. for connecting the breaker to the main air supply bus pipes.

Air is compressed and stored at 600 lb/sq in. in outdoor mounted receivers fed from standard compressor units. An automatic reducing valve provides 300 lb/sq in. air to the duplicate bus air pipes which in turn pass the air to the local breaker receivers.

Current-transformers are mounted in oil-filled porcelain enclosures. The design incorporates a hairpin primary winding with graded insulation to meet the test specification for the circuit-breaker. Five secondary windings can be included with a nominal ratio of 600:1 and capable of operating up to 1,200 amps primary current.

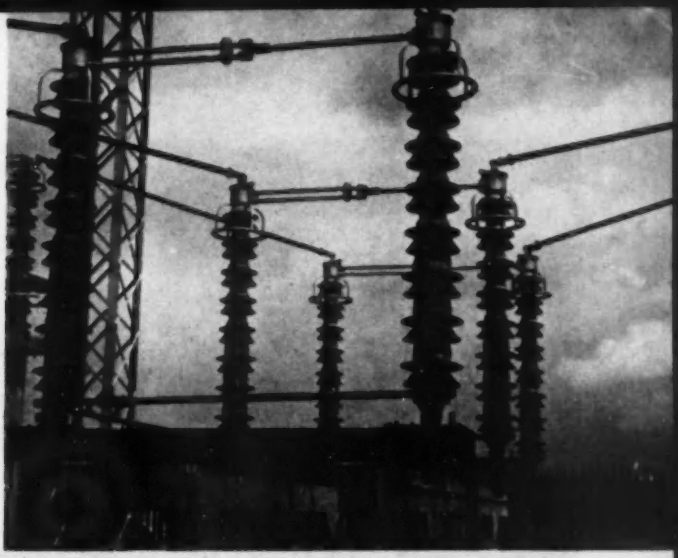
At Staythorpe the auto-transformer is of British Thompson Houston manufacture, while at West Melton an English Electric unit has been used. Both these transformers are of five-limb construction with separate radiator banks.

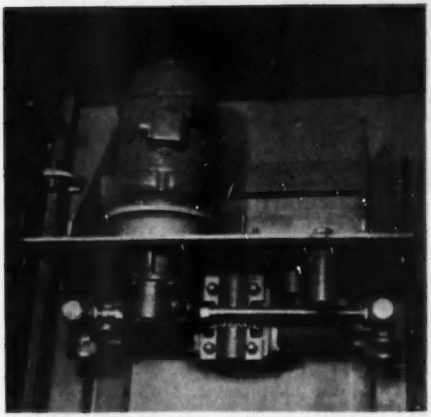
Cable Testing

Advantage has been taken of the presence of a 275 kV circuit to establish a cable-testing station located about a mile away from Staythorpe. Manufacturers will thereby be enabled to obtain data on the performance, under load, of high voltage cables without the necessity of going abroad as has been the case in the past. A jumper will be removed from one of the phase lines on a tower, and connections will

Jointing a 275 kV cable at the testing station

be made through isolators to permit the testing of several lengths of cable in series. As, however, the Staythorpe-West Melton line will not be sufficiently loaded to test cables for the 275 kV Supergrid to their thermal limit, the companies taking advantage of this facility are arranging that the full load I^2R losses can be attained by either restricting the cross-sectional area of the cable or, alternatively, making the cores of a material with a greater resistance than normal. B.I.C.C. for example, are using a cable specially designed for





The 275 kV Ferguson Pailin isolators are shown above, and on left is the motor-driven hydraulic operating mechanism for the isolators

testing while Pirelli-General are using a conductor made of brass. By these means the same losses will occur as for the cable under full load, and the thermal characteristics can be accurately assessed. Of particular interest are the various techniques adopted for jointing and for terminations.

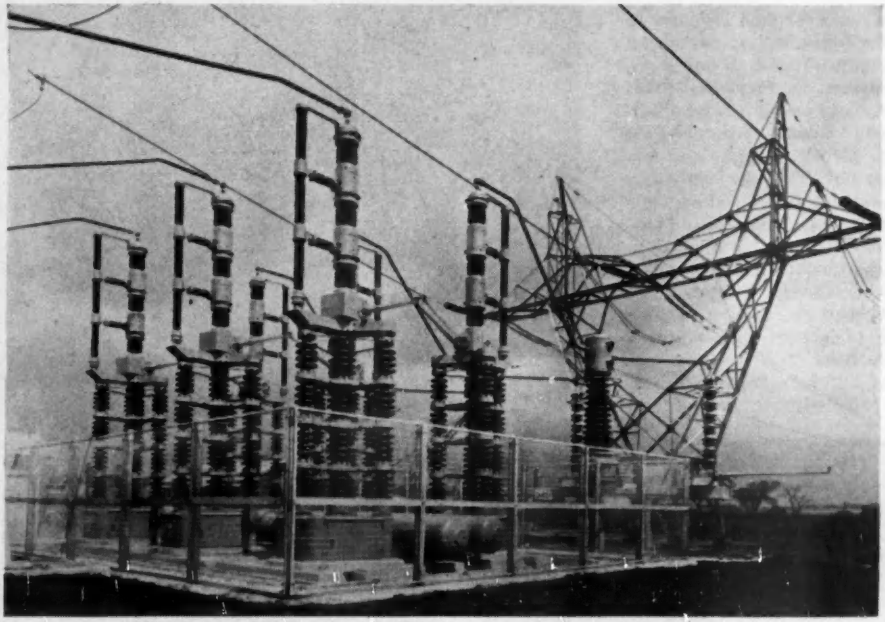
The B.I.C.C. cable is of the impregnated pressure type and is designed to operate at a maximum stress at the conductor of 110 kV/cm, under a nitrogen pressure of 200 lb/sq in. The conductor of the special cable for test purposes consists of a stranded centre made up of 61/·083 in. aluminium wires, covered with a paper separator over which is stranded a single layer of 47/·066 in. aluminium wires which will actually carry the current, giving an effective conductor area of 0·16 sq in.

During the time the cables are on test, the surges to which they are subjected will be measured, together with continuous recordings of sheath temperature, voltage and load.

Opening Ceremony

The opening ceremony in this case was of course carried out with the precise routine necessary for the switching in of a major connector on a nation-wide network. No alternative could have been possible. First Mr. L. F. Jeffrey, Controller of the East Midlands Division obtained confirmation of clearance at the Staythorpe end of the line from Mr. J. D. Pierce, the transmission engineer. This being verified, he informed West Melton and obtained assent that there were no earths on the section. Birmingham Control was then notified that the section was ready to take load and the preliminary procedure of isolator closing and transference of the 132 kV circuit-breaker to remote control was transmitted to enable both Birmingham and Central Control to make the necessary amendments to the mimic diagram, etc. Sir John Hacking was then made an "authorised person" to carry out the switching operation and after the isolators had been closed, "made" the circuit-breaker which connected the Staythorpe transformer to the line. The fact that the section was energised was patently obvious to the assembled audience, not only from the transformer hum but also by the discharge hiss from the system.

In a short speech, Sir John emphasised the pleasure it gave him to perform the ceremony, as he had been associated with the project from the beginning. Immediately after the war the C.E.B., on his recommendation, decided to instal a Yorkshire-Midlands interconnector



The English Electric air-blast 275 kV circuit- breaker at West Melton

at 275 kV. This had now been accomplished. He thanked the representatives of all bodies who had taken part in this venture and pointed out that this not only put Great Britain again among the leaders of high voltage equipment (some parts of the system would go up to 380 kV) but also would provide a general saving by permitting pooling of generating plant. In a democracy criticism was only to be expected, but if the facts were explained it was possible to obtain co-operation.

At luncheon, Mr. L. F. Jeffrey, who proposed the toast of "The Guests," specifically mentioned Mr. F. J. Lane, Mr. C. W. Marshall, Dr. J. S. Forrest, and, of course, Sir John Hacking, as being most intimately connected with the 275 kV project. Mr. T. G. N. Haldane (Merz and McLellan) and Col. Leeson of BEAMA had also played a great and important part. Today, he thought, was an outstanding day in the history of the industry.

Replying, Col. B. H. Leeson referred to the wonderful co-operation between all branches of the industry which had made the opening possible. To the British manufacturer it was a great asset. It was a tremendous advantage when selling high voltage equipment abroad to be able to say, "We've actually got it in operation in this country." On the problem of protection, the manufacturers were ready to provide systems at this voltage as reliable as those which protected the 132kV system during the war.

Mr. T. G. N. Haldane, who also replied, congratulated Mr. V. A. Pask and Mr. D. P. Sayers and the manufacturers on their great work. He could remember the ceremony when the first sections of the 132kV Grid were commissioned and if Sir John Snell, Col. Crompton, Sir Archibald Page and Charles Merz had been alive today they would all have been pleased to see this new development. Overseas, knowledge of our work in this field would spread, and the B.E.A. had made a good contribution to the export market.

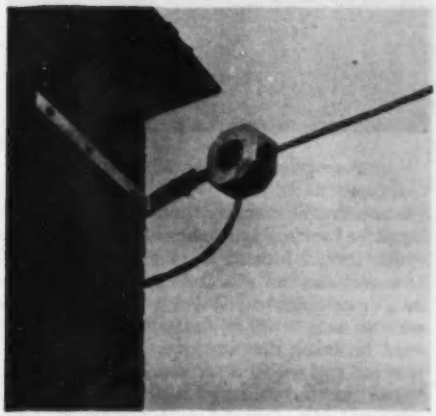
PRINCIPAL MANUFACTURERS & CONTRACTORS

Bruce Peebles, Ltd.
British Thomson-Houston Co., Ltd.
Crompton Parkinson, Ltd. (Brit. Elec. Trans. Co.)
English Electric Co., Ltd.
Ferguson Pailin, Ltd.
Ferranti, Ltd.
General Electric Co., Ltd.
Hackbridge & Hewittic Co., Ltd.
Metropolitan-Vickers Electrical Co., Ltd.
C. A. Parsons & Co., Ltd.
A. Reyrolle & Co., Ltd.
Balfour Beatty & Co., Ltd.
British Insulated Callender's Construction Co., Ltd.
J. L. Eve Construction Co., Ltd.
W. T. Henley's Telegraph Works Co., Ltd.
Watsham's, Ltd.

Catenary Wiring to Outbuildings

MODIFICATION OF A STANDARD SYSTEM

By J. MELLANBY,
M.A., A.M.I.E.E., M.Inst.F.



WHILE there are many methods available for taking supplies of electricity to isolated buildings a few hundred feet apart, it has been found that provided all safety and other regulations are complied with, disadvantages may be listed under the headings of high cost or unsightliness. Both of these may easily militate against the wiring of structures whose use of current may be small. Buried cables will often be unduly costly, overhead lines using bare conductors require a great deal of work in the provision of poles, ironwork, etc., and the conventional catenary system, where insulated conductors are hung from a wire by suspenders, is probably the worst form of eyesore which engineers have yet designed.

However, a system has been devised, under the name of "Grid Suspension" in which the conductors and the catenary are included within the same covering, primarily as an economical means of providing light and power facilities in large buildings, for which purpose it can be very advantageous. The system has also been used out of doors, both for street lighting and for connections to separate buildings, and it is hoped that the following notes may be of help to those considering it for the latter purpose.

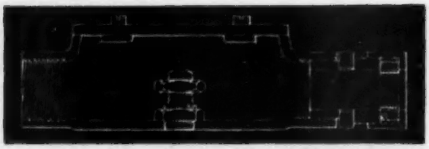
Terminations

At terminations, standard fittings and boxes may be used as in the "Angle" position, and the slack end of the cable used as a lead in. This avoids cutting the conductors and making joints in mid-air. When the cable is to be connected to fixed wiring, conduit, t.r.s., etc, it is recommended that a junction box fitted with a substantial earth terminal be used, in which the stiff catenary wires can be fixed. An assembly is illustrated in which the catenary cable enters through a stuffing gland to give weatherproofness in exterior situations, and the conductors continue in ordinary lead-covered cable.

Modified Box

Sometimes it may be desired, however, to make the whole of the lead-in in conduit, t.r.s. or l.c. cable; this is usually necessary when a connection is teed off from the catenary cable. The following procedure, which differs from that suggested by the makers, has been found to have advantages, especially as it greatly reduces the number of small components to be handled on top of a ladder. Ignore the bottom outlet in the standard box, and drill and tap a hole in an adjacent side to which a cable gland can be fitted. Place this half box on to the anchor bolt and secure with the nut. Both hands will now be completely free for the operation of jointing, and no parts of the box need be handled until the joint is complete and it is necessary to fit the second half box.

In the smaller sizes, straining to an adequate tension can be carried out easily and without special equipment. First the cable should be measured and the anchors fitted the correct distance apart—this is most important. Correct tension and sag depend on accurate spacing. If a straining ratchet is available tensioning is of course easy, but equally good results can be obtained without it. One anchor will be permanently fixed, while at the other an eye-bolt with a long screwed shank should be used. These are standard items used in fencing, obtainable from builders' ironmongers. The initial tensioning can then be done with the aid of a rope made off round the anchor bolt. When the bridle had been brought up to the



Arrangement of modified cable box

eye-bolt, a bolt is inserted and the final tensioning given by screwing up the nut on the eye-bolt, which should provide a travel of about 8 in. One man can easily install cable of 7/·036 size on a span of up to 100 feet by himself; with a mate to help it will be found still easier. Care must be taken that supports are of adequate strength and stayed if necessary. However it is hoped that the above description and illustrations will show that the job can easily be done by an ordinary wireman without special overhead experience or tackle.

Earthing

The use of the catenary as an earth wire has been mentioned. Since this is of steel and has a higher resistance than the associated conductors, it may not strictly comply with the I.E.E. regulations, though these do not in general apply to service connections and wiring exterior to buildings. In the smaller sizes this catenary resistance is about 1 ohm per 100 feet, and less in the larger cables. In any particular installation all the earth resistances should be taken into consideration to ascertain if reasonably safe conditions will be achieved. If, however, the system were to come into general use for this sort of work, the manufacturers might well consider the addition of a copper or aluminium strand to reinforce the conductivity of the catenary, even at the expense of some mechanical strength. Another suggestion which could be put forward is the provision of a very much smaller box for use at terminations where the cable is taken straight through and no junctions are required. Where appearance is important, the box shown in the illustration is likely to be thought unduly large.

In conclusion, this type of cable provides the electrical engineer with a means of extending the use of electricity into a number of "borderline" cases where considerations of costs or æsthetics might mean its exclusion.

Yugoslavia to Export Power

PROSPECTS of a new international hydro-electric power company are suggested by the formation of Yougelexport, an international body which is to study the utilisation of that country's water resources. Early steps are being taken under the auspices of the U.N. Economic Commission for Europe, the countries immediately interested being Austria, Italy and Western Germany, besides Yugoslavia herself.

Figures issued in recent United Nations reports have given the 1951 installed capacity of Yugoslavia's hydro-electric system as 371 MW, while the thermal power station total was 600 MW. Production figures for this year are not readily available, but for 1950, when the installed capacity was 350 and 300 MW respectively, production was 1,175 and 1,227 m kWh for hydro and thermal plants.

This falls far short of the country's prospective output, one recent study suggesting that only 2 to 3% of the economically exploitable hydro-electric resources of Yugoslavia have yet been exploited. This checks roughly with an estimate given in the report "Hydro-Electric Potential in Europe" (see ELECTRICAL TIMES of June 25, 1953), that it might be physically possible to harness 70×10^9 kWh (say, 8,000 MW on a mean flow basis), while the economic limit is probably 50×10^9 kWh a year.

Committees have been set up to study legal, financial, economic and, most important of all, technical aspects of any export agreement. These have become active in the past few months, and they are keeping contact with representatives of France, Switzerland and Belgium, who are also interested in the possibility of export agreements.

Whatever the outcome of this ambitious project may be, the very fact that it has been attempted indicates another success for the Committee on Electric Power of the U.N. Economic Commission for Europe. It was from study groups set up by this committee that Yougelexport grew, and previous work of the members and secretariat of the committee will have an important part to play in facilitating the solution of many problems that will arise as the project develops.

Yugoslavia has ambitious plans already in operation for the development of her electrical power system. On the results of meetings that have taken place in the past week will depend the possible expansion of such plans to a markedly larger scale.

Our readers' views . . .

Are Condensers Really Necessary?

MR. MEADOWS in his article on Welders (July 9) stated that condensers moderate voltage flicker caused by welders. I contend that they do not. It appears to me that the sudden application of a certain load in amps at a certain p.f. should always result in the same flicker voltage, whether the distributor is loaded with resistors or condensers.

With regard to the load factor of a welder, in many cases it is so small that its thermal effect on the distribution system is negligible.

P. F. Winterbottom

BRISTOL 6

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A Link with Kelvin

AT the time of writing this letter, a 165 ft octagonal chimney stack is in the process of being demolished in Shoreditch, which removes yet another material landmark closely connected with the early days of electricity supply.

It may be of interest to your readers to know that this particular chimney stack formed part of the original "combined Electricity Generating Station and Refuse Destructor Works," which was erected at Coronet Street by the Vestry of St. Leonard, Shoreditch (the predecessors of the Metropolitan Borough of Shoreditch) and was officially opened by Lord Kelvin on June 28, 1897, the Chief Electrical Engineer of the Undertaking being Mr. C. Newton Russell.

This was the first installation, not only in London, but in England, to utilise the heat generated by burning local refuse for the production of electricity. The steam thus raised, in addition to running the "electric central station," also supplied all the heat required for the adjoining Public Baths in Pitfield Street.

With the subsequent erection and development of a further generating station within the Borough at Whiston Street (the present Whiston Road Power Station), the old generating plant at Coronet Street was no longer utilised except in emergency. A notable instance of such a contingency occurred during my period as Borough Electrical Engineer and Manager of the Undertaking when, at the time of the Coal Crisis in February, 1947, in order to help things, I had two of the 250 kW steam sets of 1898 vintage run up again and placed on load, and supplied current quite successfully to the d.c. network.

The boiler plant and its associated equipment at Coronet Street, however, continued to handle the whole of the refuse of the Borough, and also to fulfil its other original function of supplying heat to the Baths until October, 1950.

Such a record of over 53 years continuous and most arduous service with, it should be noted, a large proportion of the original plant still remaining in commission is, I feel, a fine tribute to the sound engineering skill of all those pioneers who designed and constructed the original installation.

R. H. Rawll
M.I.Mech.E., M.I.E.E.

LONDON ELECTRICITY BOARD

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Domestic Cooker Installations

A POINT occurs to me regarding domestic cooker installations, which I think now needs some serious consideration. The latest cookers seem to have a general trend to up-loading. They have now, in fact, reached a point that, taking diversities as laid down in the I.E.E. Regulations, these cookers can no longer be connected to the usual 30 amp circuit.

In actual fact, of course, these cookers are being connected to the usual 7/·044 cables, but it seems that this is only happening because the installation inspectors are connecting these circuits before the cookers are actually sited.

As an example, take the new Revo Monarch, total loading 7·9 kW. On 230 V this gives us 34·3 amps. Allowing for the 13 amp type outlet on the control unit, this gives us :

100% F.L. up to 10 amps.	10 amps.
50% of any load in excess of 10 amps.	12 amps.
13 amp. outlet on Control Unit. (100%)	13 amps.
Total:	35 amps.

It does appear that larger capacity control units should be made, or alternatively it will mean using a type which has no incorporated socket outlook.

It looks as though a 45 amp capacity domestic cooker control unit would be a useful addition. Perhaps there is one already marketed, although I haven't come across it.

Frank L. A. Morris

PENRITH

Radio Research Last Year

Effects of Ionosphere and Geological Formation on Propagation

IN reporting its activities in 1952, the Radio Research Board again expresses its concern at staff shortages. Staff in previous years has been insufficient to meet all research requirements and the last year saw a deterioration in this position. Prospects for the future, states the report, are not bright—on the one hand a continuing shortage of qualified workers and on the other limitations on recruitment applied to the Board.

Research work during last year was confined mainly to problems of wave propagation. Much of these activities is fundamental long-term investigation with the object of continuously improving the operation efficiency of radio communication systems. Particular emphasis in this respect has been given to studies of the behaviour of the ionosphere, work which last year benefited by the occurrence of two solar eclipses.

Ionosphere Investigation

For its investigations into the ionosphere the Board maintains observatories in various parts of the world at which research has been conducted along several particular lines. Most of these observatories record the chief characteristics of the ionosphere by a method known as vertical-incidence sounding. From results of these observations, together with additional information supplied by other organisations, forecasts up to six months in advance can be made of conditions for h.f. radio transmission.

Over and above this work, three of these observatories conduct experiments to determine the absorption by the ionosphere of radio waves at vertical-incidence. Practical applications are under review of using this data for calculating field strengths and lowest usable frequencies. Thirdly, ionospheric conditions at oblique-incidence are being studied. Here, long-delay echoes of an h.f. pulse transmission, received at the transmitting site, are used. The pulse transmission is reflected from the ionosphere and strikes the earth at large distances from the transmitter. Of this wave, the back-scattered component is received, as the echo, at the transmitter site. As the energy, of which the back-scatter is a component, is propagated by way of the ionosphere, the echoes provide a means of studying propagating conditions.

L.F. Propagation

Other radio research has been devoted to the propagation of low frequency waves along the earth's surface. Such transmissions are used in radio-navigation, and last year's work was concerned with measurements of propagation speed on the ground wave, a property affected by the conductivity, and hence the geological structure, of the ground. In practice, transmissions from stations of the Decca Navigator System were used over a land path between Lewes and Norwich, measuring the phase of the signal and its rate of change with distance. The selected path contains marked changes in geological structure, particularly that between the chalk of the North Downs and the Thames-side marshes near Gravesend.

Close agreement was obtained between measured and predicted phase changes, whilst a slight modification of the equipment enabled phase changes in the Gravesend area to be explored in more detail. At present, however, limitations imposed by the method used make it almost impracticable to investigate over-sea propagation and coastal effects, although a new scheme of measurement is being developed which may have possibilities in this respect.

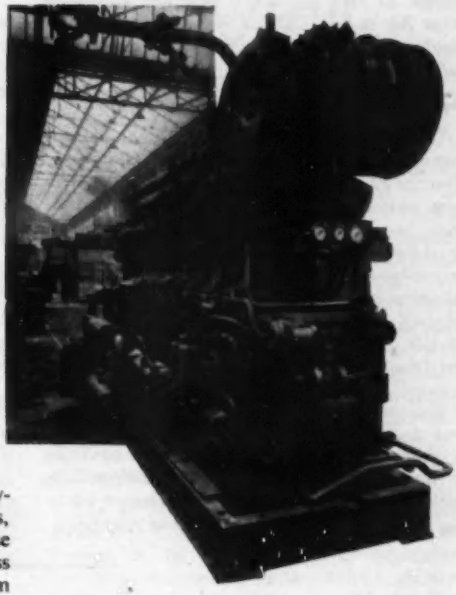
Atmospheric Noise

A study is also being made of atmospheric noise to determine those characteristics of noise which must be specified to define its interference with a particular type of radio service. Moreover, a survey of noise measurements made between 1945 and 1951 was prepared in which the results given are as minimum signal strengths required for intelligible reception of slow speed morse code transmissions. Other work in this sphere has been concerned with estimating the location of thunderstorms.

Research on materials having radio application was confined in 1952 to studies of germanium and ferromagnetic and ferroelectric materials. For the former, particular attention has been paid to characteristics near the origin, the applied voltages being less than 0·1 V. Investigations of this nature have provided fundamental information of the rectifying barrier without extraneous effects introduced by heating, high field intensities and other factors resulting from higher applied voltages.

Control of Large Diesel Generators

New system provides complete automatic control of starting and stopping operations on stand-by plant



THE ever-increasing demand for fully-automatic stand-by power generation sets, which will start up on mains failure and close down when power is restored, has led Mirrless Bickerton and Day to develop a control system for their two ranges of diesel engines, "J" and "K."

These engines are built in both in-line and vee forms, naturally aspirated, pressure-charged and high pressure-charged with air inter-coolers. The "J" engines are built in sizes from 3 to 16 cylinders, are suitable for speeds up to 1,000 r.p.m. and cover a power range from 165 to 2,500 b.h.p. The "K" engines, with 5 to 12 cylinders, are suitable for speeds up to 450 r.p.m. with a power range from 485 to 3,000 b.h.p.

Operation of Control

The automatic control described refers to Mirrless engines, and the "J" range in particular. The underlying principles can, of course, be applied to other types of diesel engine.

When a mains failure occurs, a pair of contacts close to initiate a "start on" signal from a battery supply. This signal initiates the starting sequence. The first two operations consist of energising the air safety interlock solenoid (which permits starting air to pass to the starting valve), and the running-up of a motor-driven lubricating priming pump. When the engine system has been primed to the desired pressure, a pressure switch operates and energises via relays, the solenoids of the differential air valve and fuel pump control shaft. The former allows starting air to pass to the engine cylinders, as determined by the air start cams on the camshaft, and the latter actuates the fuel pump control shaft to the "no-fuel" position, thus preventing a build-up of fuel in the cylinders while the engine is turning on starting air.

After 2 to 3 seconds the fuel control shaft solenoid is de-energised and the fuel pumps move over, under governor action, to maximum fuel position. The engine speed rapidly picks up with both compressed air and fuel being admitted for a period of 1 or 2 seconds, and the start is complete. At about half speed a centrifugal switch closes a pair of its contacts and de-energises the start system, while at full speed a second centrifugal switch signals the control station that the machine is up to speed and ready for load.

If the engine fails to start the starting sequence is repeated at intervals of 15 seconds, but after 120 seconds an overall time relay cancels the whole starting sequence by de-energising the starting gear and stopping the priming pump. A lamp labelled "engine locked out" lights and a klaxon sounds.

On resumption of mains supply or by manual operation of the stop button, the stop sequence is initiated by a relay which energises the fuel control shaft solenoid, moves the fuel

pumps to the "no-fuel" position and thus stops the engine. About 90 seconds later the whole equipment resets itself in preparation for the next start.

Protection

The electric circuits for protection and alarm features of the set are energised some 60 seconds after the engine starts. These consist of a water-flow switch, two water-temperature thermostats, two oil-pressure switches and two centrifugal switches. On cessation of water flow, the protective switch operates and initiates the stopping sequence. At the same time a lamp labelled "water flow" lights up and a klaxon sounds. The engine cannot be restarted until the fault is rectified and the control cabinet manually reset by a push-button.

The thermostats operate sequentially to give first a preliminary notice of high water temperature, and should the temperature continue to rise the second thermostat closes and initiates the stopping sequence. The oil pressure warning equipments operate in the same manner.

Engine speed protection is covered by two centrifugal switches, one indicating engine speed (previously referred to) the signal of which is cancelled should the engine speed fall below normal speed fluctuation and one as over-speed protection which operates the stopping sequence when the speed rises to 12% above normal. In addition, an overall mechanical speed cutout is included, set at about 50 r.p.m. above the protection limit afforded by the centrifugal switch.

Auto-start equipment is instrumented so that routine tests can be made to check the efficiency of the gear by simulating a mains failure and all gear on engines is interconnected so that normal hand-starting of the engines can be used during maintenance periods.

The auto-start cabinets are constructed on the tray principle with space provided to enable additional automatic gear to be incorporated for automatic synchronising of generator sets, cascade starting of two or more electric motors for pumps or fans of cooling system and the interlocking of the main c.b's.

Peat-burning Turbines for the Highlands

AN experimental peat-burning power station is to be built by the North of Scotland Hydro-Electric Board at Altnabreac, Caithness. This was announced by the Secretary of State for Scotland, Mr. J. Stuart, during the House of Commons debate on Scottish affairs last week, and the project is to be put in hand at once. A recommendation that a power station of this sort should be constructed has been made by the committee set up under the chairmanship of Sir Edward Appleton to investigate possibilities of developing Scottish peat deposits. That report is in an advanced stage of preparation. The N. of Scotland Board will receive assistance from the Development Fund.

Giving some details of the project, Mr. Stuart said the plant would consist of a 2,000 kW closed cycle gas turbine which had been developed by John Brown and Co., of Clydebank. That company has been working with the Board at this type of machine for about six years, and a 12,000 kW oil-burning turbine of the same kind, the first in this country, will probably be operating at Carolina Port, Dundee, in about four months' time. In addition, the project will include a 750 kW open cycle turbine made by Ruston and Hornsby Ltd. The whole pilot scheme is expected to take about three or four years to complete.

In the meantime, we have been informed, the next information on the subject will probably be contained in the Appleton Report, but further details are not at present available. No firm contracts have yet been placed and negotiations between John Brown and Co. and the Board are still in progress. Ditching, foundation and similar work on the new station is expected to start in about 12 months' time. Preliminary borings which have been taking place have revealed that about 600 million tons of peat are available in Scotland in suitable areas.

As regards cost, Mr. Stuart said the whole of the previous experimental costs had been borne by the Development Fund which would also meet the main capital and development costs of the scheme, estimated at about £500,000. The Hydro-Electric Board and the B.E.A. would make contributions, and running costs would be borne by the Board.

If this project proves successful, the Hydro-Electric Board intend to go ahead with larger schemes in a number of other suitable areas in the Highlands. Mr. Stuart stated finally that the peat projects would provide a most welcome addition to the nation's fuel and power supplies.

INDOOR H.V. SWITCHGEAR

132 kV Installation Commissioned at Carmarthen Bay

AN interesting installation of 132 kV, 2,500 MVA indoor switchgear was commissioned at Carmarthen Bay power station last month. This switching station initially controls two generator transformers, two station transformers, six feeders, one bus section and one bus coupler, and is of a type not previously used in this country.

The main switchgear, manufactured by Ferguson Pailin, is housed in a large "hall" type building centrally divided by a wall, and various plant rooms, into the "east" and "west" half switch houses. Six air-blast circuit-breakers are employed, and these are mounted in two rows on either side of the switch-house. The generator, station transformer and bus coupler circuits are located on the south side with the feeder circuits on the north side.

Busbars

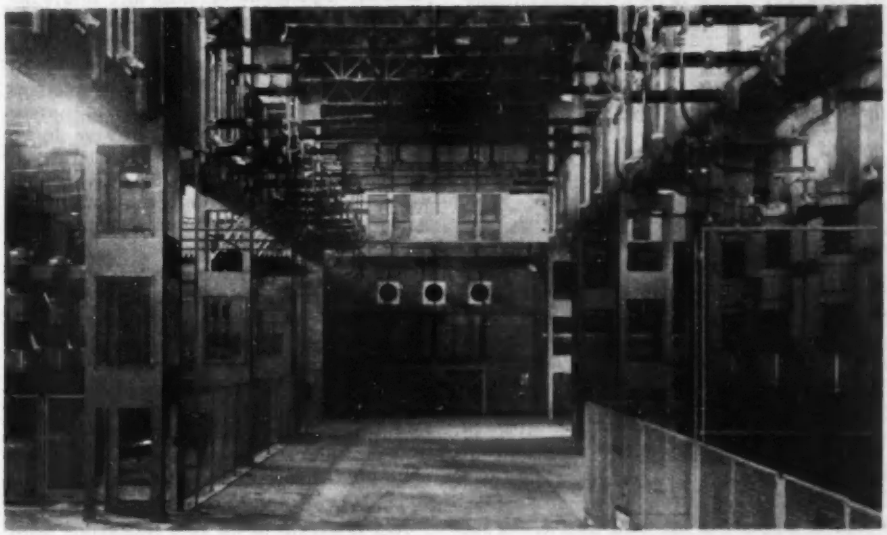
The busbars are suspended from roof trusses by solid-core porcelain insulators. The main busbar runs down the centre of each half station and the reserve bar is arranged in a double "U" formation coupled by two isolators. Access to the busbars for maintenance is obtained by means of trolleys suspended from rails running between the various phases.

The incoming lines are terminated on towers immediately outside the building and brought in by means of synthetic resin-bonded paper condenser bushings passing through the walls. Connections from the generator and station transformers are by means of cables which are terminated at sealing ends mounted in a separate compartment on the south side.

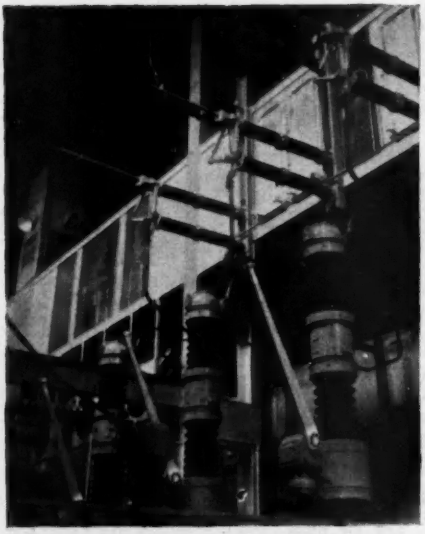
Circuit-Breakers

The air blast circuit-breakers are Ferguson Pailin type CA.132 and are a slightly modified version of the standard outdoor equipment, the main concession to the indoor principle being the support insulators for the fixed isolator contacts.

Each breaker comprises three single-phase units incorporating two interrupter heads per



This general view of the east half of the station shows the incoming 132kV connectors, busbars in the roof and part of the switchgear



Close up of an air-blast circuit-breaker showing interrupter heads and vertical isolators

phase and arranged in series on one side of the breaker. The sequential isolators associated with each phase are of single-break design and move in a vertical plane. Separate control units are provided on each phase, and to guard against failure of a trip coil all three phases are coupled together pneumatically.

Isolators

All isolators are single-break and are mechanically coupled and are operated from ground level by a hand-operated mechanism. The busbar isolators are mounted vertically on the main steelwork inside the building, while feeder isolators are mounted horizontally on floor mounting structures.

Access to the busbar isolators is obtained from a walk-way in the main steelwork. Hinged platforms can be let down between the phases of the isolators for maintenance purposes, and these platforms are interlocked so that they can only be lowered when the particular busbar concerned is earthed. When the busbar is alive the platform forms part of the screenwork on either side of the walk-way.

Air System

Air is supplied to the local receivers of the air-blast breakers by means of a ring main pipe system connected to duplicate banks of compressors. Initially there are two compressors per bank, but the final arrangement will comprise three per bank. Air is stored in the main storage receivers at 650 lb/sq in. and passes to the individual receivers via a reducing valve which drops the pressure to 300 lb/sq in. The breakers are remotely operated from the control room in the power station building. Conventional panels are used with a normally dark mimic mounted at eye-level and employing discrepancy type control switches and semaphores. The relay panels for the generator land station transformer circuits are also located in the power station building, adjacent to the control room, whilst the feeder relay panels and bus zone panels are mounted in the switch-house relay room.

MINING CABLE REGULATIONS

MODIFICATIONS to the electricity provisions of the General Regulations under the Coal Mines Act are proposed in a draft issued this week by the Ministry of Fuel and Power. These modifications affect the provision of earthing arrangements in trailing cables.

In a covering notice, M.F.P. Safety Circular No. 204, it is explained that Part III of the General Regulations of 1913 lays down the minimum size of earthing conductors for cables used underground, and prohibits the use of a flexible metal covering alone for earthing portable apparatus. The 1920 Regulations apply much the same provisions to surface equipment. Since the Regulations were drawn up, cables have been developed which are no less safe and efficient than older types, but which do not comply with these requirements. At present such cables are used under authority of Defence Regulation 59(2).

The new draft regulations will be issued as a statutory instrument under the title "The Coal Mines (Electricity) (Earthing Systems) General Regulations, 1953" and they provide, in general, that earthing conductors in flexible cables for voltages above 125 V need not have a cross section greater than 0·01 sq in. They also make provision for the use of Type 21 cables of BS708 (which have a galvanised steel strand armouring that can be used as an earthing conductor).

Any objection to the new Regulation must be sent to the Ministry of Fuel and Power before August 22 next.

NOTES ON WIRING by Megohm

Thoughts on Estimating

TO estimate is to assess with reasonable accuracy the amount of equipment and materials and/or the time required to carry out a given operation under specified conditions.

The problem of estimating as applied to the electrical contracting industry also involves covering for unknown factors which are not always clearly indicated in "Conditions of Contracts and Specifications"; for example, factors such as the rate of progress of civil and building constructional work and the delivery of equipment to be supplied by others is sometimes not disclosed. Delays in connection with these matters can cause considerable variation in labour and site supervision costs, and should it become necessary to seek reimbursement to meet these additional costs, they will not be freely admitted by the client's representative, possibly due to lack of appreciation and experience of such conditions. Again, some specifications are drawn up in such a way that they may be read in more than one way and lead one to believe that they are intentionally formulated in this manner for a given purpose.

An estimate for electrical services can be prepared from:

(1) A specification detailing equipment and materials to be used and a set of scale drawings indicating the position of equipment, outlets, main cable runs, etc., or

(2) Where no drawings are available, visiting the site and taking particulars of the required works.

In the case where a specification and set of scale drawings are available the taking off of quantities for the equipment and materials and drafting these in the form of a schedule is the first step. After the quantities have been scheduled and priced the labour and supervision content can be added and the estimate completed. It is advantageous that an inspections of site conditions be made.

When an inquiry is received without drawings it is, of course, necessary to visit the site and take particulars. It is under these conditions that the estimator's experience will count and the good estimator should be able to accurately value the quantities of materials and equipment required and formulate a sound cost for the labour and supervision required to complete the work.

The visiting of distant sites, of course, is an expensive matter in time and out-of-pocket expenses and it is understandable that many tenders are submitted without the contractor's representative visiting the site in view of the fact that reimbursement for such expenses incurred is not made. It may be optimistic to suggest that it would be to the benefit of the purchaser if some reasonable sum were paid to each contractor invited to submit a tender to meet such expenses where a bona fide tender is submitted on time.

Notwithstanding the skill and experience required to prepare an accurate estimate by the foregoing methods, there is a further factor which may influence the estimated figure. Successful estimators will know that conditions are often the subject of variation and in some cases the whole of the layout may be revised from that shown on the tender drawings.

Large Contracts

For estimates of the order of £1,000 and above, the costs are usually required to be subdivided under headings such as main and submain cables, circuit wiring for lighting, socket outlets, and power, etc. Further, rates have to be given indicating the total quantities and the cost for supply and erection shown separately for the several types of cables and components for the complete installation. This method of submitting an estimate is generally called for by the B.E.A. divisions and consulting engineers and whilst there are points in its favour, this method does entail more work for contractors in preparation of estimates, especially where several copies of the estimates are required.

It should not be difficult to visualise that it is no small task asking say half a dozen contractors to fill up some 200/300 rates, etc.

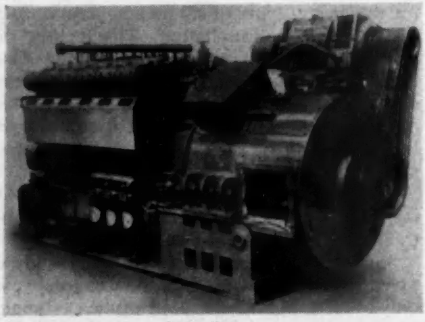
Surely much paper work and time could be saved if, in the first instance, contractors were only asked to submit one copy of their estimate and further information in respect of schedules, etc., could be called for from the two contractors whose estimates are most favourable.

Diesel Electric Traction

First of ten B.T.H. 1,000 h.p. locomotives for New South Wales Railways is now undergoing test

UNDER construction at the Midland works of the Metropolitan-Cammell Carriage and Wagon Co. are ten 1,000 h.p. diesel-electric locomotives on order for the New South Wales Government Railway by the British Thomson-Houston Co., the first of which is now complete and undergoing test. Designed primarily for shunting and marshalling duties, the locomotives have a tractive effort at starting of 51,000 lb, falling to 22,800 continuously, from the two Davey, Paxman engines in each loco. Having a maximum road speed of 57 m.p.h., the locomotives can also be used to haul mixed passenger and freight loads on secondary systems.

An unusual feature of these locomotives is the centrally disposed cab, placed between two independent power units. Previous experience with this style of construction has given the N.S.W.G.R. a preference for it, but its adoption brings several advantages. For light duties, but one unit need only be in use, thereby effecting substantial fuel saving. There is the further consideration that these locomotives may be required to operate for long periods away from skilled attention, where the value of two power units, should one break down, becomes obvious. For this reason also, design and layout—jointly effected by Metro-Cammell and B.T.H.—have concentrated on providing equipment both simple and robust, evidence of which was seen on a visit last week to the assembly works.



Here is seen one of the 500 h.p. engine-generator sets, showing the vee-belt drive to the auxiliary generator and exciter

Symmetrical Layout

With the provision of two engine-generator sets, layout is symmetrical except that next to the cab on one side is the control frame and on the other side the electrically driven compressor. Both sets are mounted on common beds which are supported on the main loco frame through "Neo-K-Tex" pads and resilient mountings. At each end of the bed plates welded end stops are provided to resist displacement. Each power unit is housed under a "bonnet," with a radiator at each end, hinged doors in the side providing easy access for maintenance. Moreover, a major portion of the roof lifts off to enable the entire set to be removed if necessary.

Two Davey, Paxman 12 RPHL Series II engines, each of 500 h.p. and running at 1,250 r.p.m., form the prime movers. Normally aspirated, they work at a b.m.e.p. of 88·5 lb/sq in. Each has 12 cylinders of 7 in. bore by 7½ in. stroke arranged in "vee" form, the use of high-speed multi-cylinder units (an additional advantage of the double power unit principle) minimising the bulk and weight of engine components, thereby facilitating their handling during engine overhaul. This is an

important aspect to a railway system in the initial stages of introducing diesel-traction.

Designed for the severe duties associated with diesel engine traction, the main generator of each set is a 310 kW 6-pole compound-wound machine supplying 500/650 amp at output potentials of 790, 650 and 500 V. A single bearing machine, it has a self-aligning roller-bearing at the commutator end, the other end of the armature shaft being solidly coupled to the engine crankshaft. On its fabricated steel magnet frame it carries supports on which are mounted the auxiliary generator and exciter. Drive to these machines is through vee-belting from a pulley mounted on an extension of the main shaft. Insulation is class "B" throughout. Air-cooling is employed, the air being drawn through Visco filters and then blown into the main compartment.

This shows the cab interior. Immediately below the driving window are seen the controls, adjacent to them being the instrument panel in the control unit, the remainder of the engine instruments being mounted in the main panel

Two axle-mounted traction motors are powered by each generator, one motor driving each axle of the two-axle bogies. As in the generator, insulation is class "B," the motors being series wound, of conventional frame construction and suspended through links and "Silent-bloc" bushes to the bogie crossbars. Ventilation is by forced air from electrically driven centrifugal blowers. Drive to the bogie axles, through heat-treated steel gearing, employs resilient type gearwheels to permit a degree of torsional resilience between wheel centre and rim.

Controls in the driver's cab are duplicated to enable the driver to operate from either side, depending on the direction in which the locomotive is travelling. At each driving position, therefore, are provided brake and power controllers, key-operated reverse drum and instrument panel. The reversing key is removable in the "off" position only and must be inserted in that control unit to be used for driving. This control, incidentally, has in addition to "forward," "reverse" and "off" positions, an "engine only" position in which the engine may be run up to speed and the control unit tested without applying power to the traction motors.

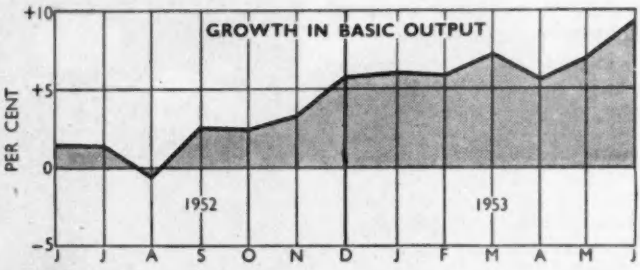
Instruments on the panel in the control unit are restricted to the minimum necessary for use when the locomotive is in use. They comprise brake gauges, speedometer and load ammeter, together with three-colour light alarms, indicating lubricating oil failure, hot engine cooling water and traction air cooler motor failure. It is left to the driver to take such action as may be necessary to overcome any fault indicated by these lamps. In an instrument panel at one end of the cab are mounted the other engine instruments.

The control equipment, duplicated for each set, is mounted in a frame and housed under one of the bonnets next to the cab. Mounted on the frame are solenoid-operated contactors for starting, traction motors and their field shunts, exciter field and battery charging, together with air-operated motor field reversing switch, field diverter resistor and relays. Control is based on the three winding generator principle, the generator having a differential series winding and self-excited and externally excited shunt windings. The latter is energised by the speed-sensitive exciter to ensure that load is reduced on fall in engine speed to balance engine power and generator output.

Above can be seen the layout of the bogies showing traction motors, gearing and brake cylinders

BASIC LOAD GROWTH

In the accompanying curve is shown how energy sold by the B.E.A. in the past 12 months compares with that of the corresponding month a year earlier. Figures used for plotting are first corrected for the effects of temperature and of the number of working days included in the calendar month. Thus the points marked are an approximate measure of the basic rate of load growth experienced by the B.E.A.



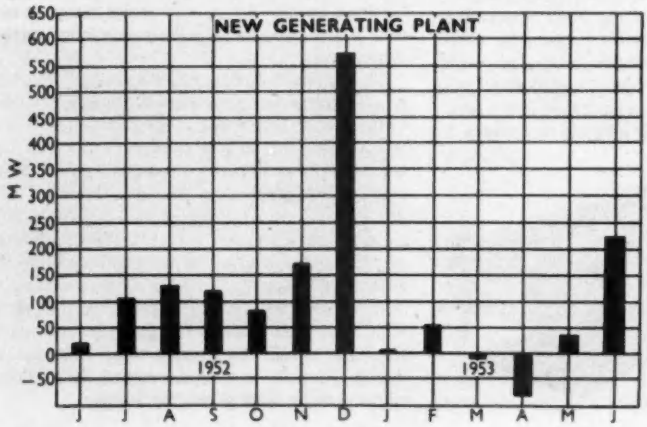
Power Supply in June

THE amount of new plant commissioned by the British Electricity Authority last month was the greatest recorded this year. Its total of five sets and nine boilers is impressive. London Division has benefited most by this commissioning, the capacities of three stations having been increased. At Barking "C," a new alternator of B.T.H. manufacture brings the total at this station to two, increasing the generating capacity there by 75 MW. Bankside's plant is increased by one set—another B.T.H. unit, of 60 MW rating—and one boiler. This latter is of Foster Wheeler manufacture having a steam capacity of 375 klb/hr at t.s.v. conditions of 900 lb/sq in., 900° F. The third station in the London Division to increase its capacity is Brunswick Wharf. Here a 52·5 MW turbo-alternator by Metropolitan-Vickers, together with a Clarke Chapman 320 klb/hr boiler, have been commissioned.

In the south east, another two stations have increased their boiler capacity. A Babcock and Wilcox 320 klb/hr unit is recorded at Brighton "B" for standard steam conditions of 900 lb/sq in., 900° F, at the turbine stop valve, whilst at Littlebrook "C," the steam capacity

B.E.A. SALES TO AREA BOARDS IN JUNE

Board	June total in million units	% inc. or dec. on June 1952
London	364·0	+12·4
South Eastern ...	223·4	+15·1
Southern	264·8	+12·9
South Western ...	127·5	+12·7
Eastern	372·0	+14·7
East Midlands ...	327·6	+12·7
Midlands	424·8	+6·0
South Wales	274·6	+8·2
Merseyside and N.W.	247·8	+5·1
Yorkshire	444·6	+13·1
North Eastern ...	266·6	+9·5
North Western ...	478·3	+13·2
South-East Scotland...	88·1	+7·8
South-West Scotland	210·4	+6·0
Direct Sales	82·6	+51·6
Grand Total ...	4,197·1	+11·5

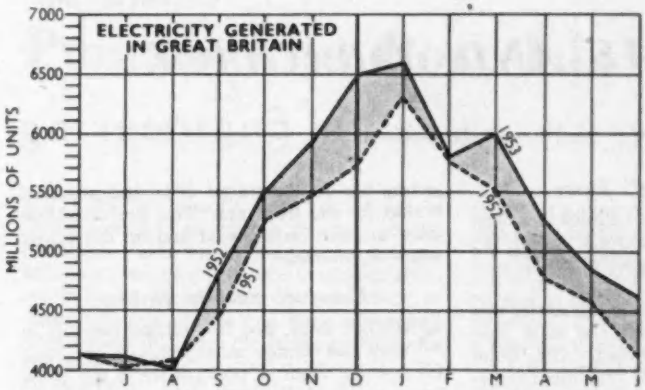


GENERATING PLANT

At the end of June, 1953, the installed capacity of the B.E.A. was 17,408 MW, showing an increase of 225 MW during the month. During the same period that of the North of Scotland H.E. Board fell by 1 MW.

The overall increase during the past twelve months is 1,413 MW or 8·5% of the total at June 30, 1952.

The total installed capacity used for the purposes of this graph is the total m.c.r. of all generating sets which are connected on both steam (if appropriate) and electric sides and are suitable for service.



UNITS GENERATED

Total generation during June amounted to 4,626 million units in stations under the control of the British Electricity Authority and the North of Scotland Hydro-Electric Board. Last year's corresponding figure was 4,127 million units.

Of June's total, 4,552 million units were generated in steam stations, whilst the contribution from hydro-electric stations was 62 million units.

Energy sent out by both Authorities during the month totalled 4,343 million units, 94% of that generated.

has been raised by the addition of a 360 klb/hr boiler, this of International Combustion manufacture. This company is also the manufacturer of the 300 k lb/hr boiler commissioned at Poole (Southern Division). Here t.s.v. steam conditions are 900 lb/sq in., 925° F.

The South Wales Division's station at Carmarthen Bay records an increase in its plant by the commissioning of a 52·5 MW set and a 240 k lb/hr boiler, supplying steam at 950 lb/sq in., 925° F (t.s.v. conditions). Here the manufacturers are, respectively, Metropolitan-Vickers and Babcock and Wilcox. For the Midlands Division, Walsall station has commissioned a further 180 k lb/hr unit, also by Babcock and Wilcox. To complete this month's list is plant commissioning at two stations in Yorkshire Division. At Keadby, a 60 MW Parsons turbo-alternator, together with a 550 k lb/hr boiler by Stirling, increase the total plant to three of each unit, whilst Thornhill records a Mitchell 200 k lb/hr boiler having been commissioned.

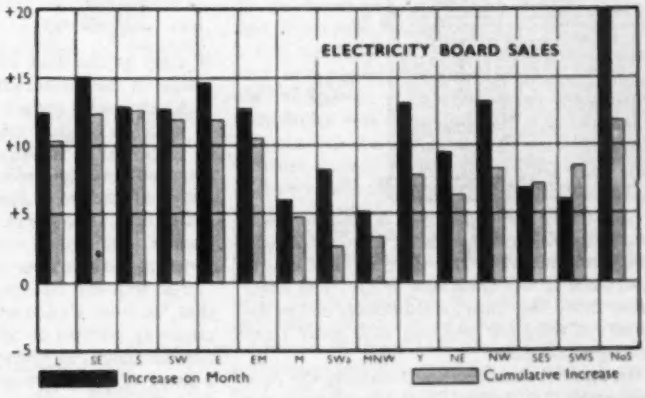
Sales

Sales during June were in all cases increased over the figures for the same month last year. Although this is due in part to lower temperatures throughout the month, and more effective working days, compared with June of last year, when corrections are made for these two factors an increase of as much as 9·3% still exists. This figure, representing the basic rate of growth of load experienced by the Authority, is the highest figure so far recorded in the last 15 months and is a weighty indication of the happier position of the supply industry. The effect of the Coronation is shown by those boards serving mainly industrial consumers, their sales increases being generally lower than those having more non-industrial consumers.

JUNE SALES

Progress in the sales of energy by the British Electricity Area Boards and by the North of Scotland H.-E. Board are represented in this diagram. For each entry the two columns indicate, respectively: the bulk supply of electricity taken by the Board (or the total sent out to Areas for the North of Scotland) in June, 1953, expressed as a percentage increase on that in June, 1952; and at the same comparison for cumulative totals based on the financial year.

It should be noted that the B.E.A. financial year runs from April 1, whilst that of the North of Scotland H.E. Board corresponds to the calendar year.



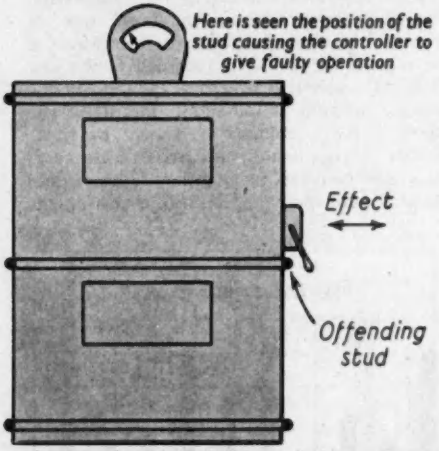
PROBLEMS AND PRACTICE in Engineering

A "Controlling" Door

THE starter for a large d.c. motor had been opened up for a routine check. It was the manual ratchet-controller type, with two contactors in the main supply.

On completing the inspection the starter was tried but refused to operate. The main contactors were not being energised. After quite some puzzling, it was found that this trouble occurred only when the starter door was closed.

With the door tightened, the starting handle was held in the "start" position when, as before, nothing happened. The door nuts down one side were slackened one by one (the other side was hinged) and on releasing the nut nearest the starting handle the contactors were energised and the motor started. On retightening this nut the motor stopped again. It was seen then that the finger contacts on the shorting disc at the extreme end of the controller drum were being just perceptibly opened; thus causing the break in the contactor coil circuit.

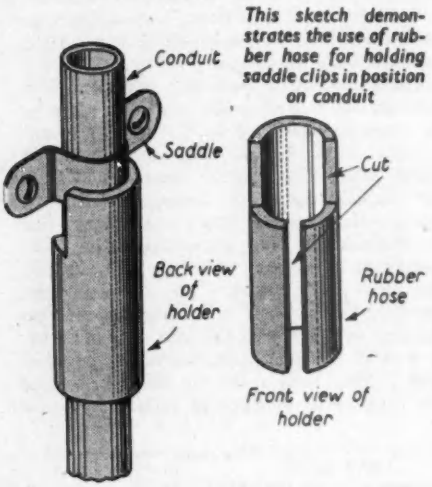


Apparently the tightening of this nut was placing a strain on the starter side, which was being transmitted to the starting handle, and from there to the controller drum. The effect was to move the drum longitudinally across the starter, moving the shorting disc away from the finger contacts.

Though the fault had been baffling the cure was simple. A second nut was put on the offending stud so that it lay behind the projecting lug on the starter door and provided a stop for the front nut. This prevented too great a strain on the stud and on the starter side.—*R. Donnelly.*

Conduit Saddle Holder

SADDLE clips used for holding conduit to walls and ceilings usually require one hand for holding them in position while the screw holes are marked. The saddle must then be removed so that plug holes can be drilled. It usually happens that the screw holes are not perfectly placed and it would be much better if some means were available for holding the saddle in the correct position.


This sketch demonstrates the use of rubber hose for holding saddle clips in position on conduit
Conduit
Saddle
Back view of holder
Cut
Rubber hose
Front view of holder

A very useful gadget for holding saddle clips in place on conduit can be made from a piece of thick-walled rubber hose. The hose length required need not exceed three inches. At one end half the hose diameter is cut away for a distance of about ¾ in. as shown in the sketch, then a longitudinal cut is made to split the remainder of the hose length.

The split can be opened with the fingers so that the hose slips over the conduit while the cut-away portion at the end holds the saddle clip in place, as shown. I have found that a piece of ½ in. bore garden hose will fit conduit effectively up to ¾ in. outside diameter for this purpose.—*C. T. Bower.*

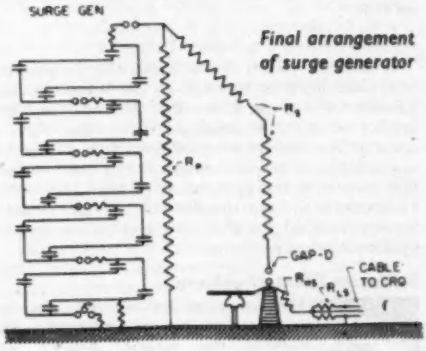
Punctures in Porcelain Insulators

Laboratory Work Simulates Field Conditions

WORK has recently been carried out in America to establish a test method and procedure which would discriminate between porcelain pin-type distribution insulators which are liable to shatter under the influence of direct lightning strokes and those which will satisfactorily discharge the stroke by flashover and then continue to operate normally after the momentary earth has been cleared.

The current standard laboratory tests as laid down in American Standard A.S.A. C29-1944 appear of little assistance as puncture failures have occurred on insulators which have satisfactorily passed the tests. One manufacturer of insulators, however, considered that a steep-front voltage surge test (rates of voltage rise from 3,000 to 10,000 kV per microsec) was useful for lightning tests.

Accordingly, Messrs. J. H. Park and H. N. Cones of the National Bureau of Standards investigated the general problem. As a power source they used a Marx type impulse generator consisting of 20 ½-microfarad capacitor units with a voltage rating of 100 kV each. Various circuit arrangements were tried to obtain the high rate of rise, the final test set-up being as in the figure. The connections between the capacitor units, which are normally arranged so that all twenty units are connected in series with the Marx gaps on discharge, were changed so that two groups of ten units were connected in parallel on discharge. This reduced the maximum output of the generator from 2,000 kV to 1,000 kV but also reduced the internal impedance of the generator to a quarter the value with all units in series. A 10,000 ohm parallel discharge resistor served to keep the voltage on the external discharge circuit at a fairly low value until the current in all of the Marx gaps had increased to several amperes. At that time the voltage across the test gap rose rapidly, causing it to fire, and applied the rapidly rising voltage to the test specimen.



Final arrangement of surge generator

Voltage Measurement

Measurement of voltage was made by using a non-inductive resistance divider located as near to the specimen as possible. The output of the low side of the divider was taken to a cathode ray oscilloscope. The divider itself had a high side value of 1,000 ohms, the low side consisting of 4 ohms.

Stray capacitance errors were minimised by keeping the total divider resistance low and the physical size of the high side resistors as small as possible. Nevertheless, even when all known precautions were taken to minimise divider errors, the accuracy attained in measuring voltage waves with times-to-crest values of less than 0·1 microsec was not definitely known, and experimental trials using several different constructions for the high side of the divider showed possible errors of ±10%.

Testing the Insulator

When it came to checking the performance of the insulators themselves, it was noticed that in no case did an insulator puncture on a first application, although several failures were noted after repeated applications of the test voltage—in some cases when the rate of voltage rise was only 3,000 kV per microsec. The heat of the arc in the absence of series resistors caused "crazing" on the insulator surface which might affect the characteristics of the insulator at the next shot. As it was thought that this was undesirable, a total series resistance of 100 ohms was added to the surge generator discharge circuit, and under those conditions the voltage across the specimen rose at a rate of 7,000 kV per microsec.

Of the 90 insulators tested, 24 failed by shattering, and it was significant that all failures occurred on types and makes that had been giving trouble in the field.

overseas news

Vote on Development

The ratepayers of Orilla, Ontario, are being asked this week to approve the borrowing of $900,000 in debentures by the Orilla Water, Light and Power Commission mainly for the purpose of financing another generating plant. The latter would apparently be a hydro-electric plant at Horseshoe Lake, a development which Commissioner E. L. Cavana estimates will cost around $800,000. But locally there seems to be some doubt whether this would be a wise plan, for the Commission already has obligations of well over $1 million, mostly on debentures floated for the Mathiasville hydro-electric plant which was opened in 1950. It is stated that Orillians have long been proud of the fact that the town operated an older electricity system than the Hydro-Electric Power Commission of Ontario, and until recent years, at lower charges too. But conditions have changed considerably in the last few years. The best available sites in the district have been developed. Other schemes may involve long transmission lines. So it is now being suggested that it might be more advantageous to the town if their utility was affiliated with the H.-E. P. Commission of Ontario.

Quebec's New Line

The Quebec Hydro-Electric Commission has been authorised to erect a power line to the Chibougamau copper and gold mining district at an estimated cost of $4 million. The line, through Dolbeau on Lake St. John, will connect Chibougamau and the Commission's large hydro-electric project on the Bersimis River.

Expenditure in Ontario

This year is expected to set a peak in the post-war capital expenditure of the Hydro-Electric Power Commission of Ontario, with an outlaying totalling $189 million, Dr. R. I. Hearn, general manager and chief engineer of the Commission, has revealed. So far this year an additional $90 million of bonds had been issued to finance the programme, bringing to $870 million the grand total issued since 1945 for expansion and improvements. Dr. Hearn emphasized that the power to be gained from the St. Lawrence Seaway development would still be needed by the Commission, especially after 1957, despite the stepping up of plans for the new hydro development at Niagara Falls. That scheme was expanded in April with plans for an ultimate capacity of 1,200,000 h.p.

St. Lawrence

Although there are still many formalities to be settled before a start can be made on the St. Lawrence River development, engineers from the Hydro-Electric Power Commission of Ontario and the New York State Power Authority, are to meet next week to discuss preliminary co-ordination work. We noted last week that the U.S. Federal Power Commission has issued a licence nominating the New York State Power Authority to deal with the U.S. side of the power development. But although Canada is anxious to get on with the job, in Toronto it is considered doubtful whether any real progress will be made during the next twelve months while the legal battles are continued.

Niagara Development

The U.S. House of Representatives has approved a Bill authorising private utility companies to construct and operate a $400 million power development at Niagara Falls on the Canadian-U.S. border. The Bill has been passed to the Senate. If it is fully approved, five undertakings which now supply about 90% of New York's electricity, will operate the expansion. The undertakings include the Consolidated Edison Co., and the Niagara Mohawk Power Corporation.

Colombia's Plans

Proposals of the second stage of the Rio Grande hydro-electric scheme, near Medellin, in Colombia, are now under consideration. Work on the first stage is already well advanced, some 70,000 kW of generating equipment having been ordered from the U.S.A., finance being provided by the Export/Import Bank. But for the second stage it is understood that finance will probably be put up locally and, as a result, British manufacturers may have an opportunity to tender, providing they can offer sufficiently attractive credit terms. This second stage is expected to cost 14 million pesos, and work is planned to begin by the end of 1954.

H.-E. Survey

A detailed survey for a hydro-electric project in Guatemala is to be made by the Westinghouse Electric Co., of the U.S. It is planned that the project should be constructed on the Pacific coastal slope near the city of Esquintla, and be in operation within four years. It has been stated that following the completion of the survey, the Government of Guatemala will call for tenders for the civil construction work and for the supply of the electrical equipment.

Railway Electrification

The construction of the electric railway line between Gdansk and Gdynia—the largest project of Poland's Six-Year Plan on the coast—is nearing completion. Part

of the line, connecting Gdansk with Sopot has been working for some time. All excavation work on the Sopot-Gdynia route has been completed and the tracks and electric cable have now been laid.

Belgian Railways

The administrative board of the Belgian Railways has decided to take part in organising fast international rail-car links. First projects likely to be considered are the routes Paris-Amsterdam, Paris-Cologne and London-Cologne. The board has also decided to purchase 83 electric locomotives from the Metallurgies de Nivelles. This order follows the purchase of 50 similar locomotives from the same firm about a year ago. These locomotives will be used on Belgium's electrified lines, which are being extended. Lines already electrified are those from Brussels to Antwerp, Brussels to Charleroi and the direct goods line from Charleroi to Antwerp. Lines now being electrified are Brussels-Ghent and Brussels-Liege.

The Karnafuli Scheme

There are indications that tenders are shortly to be called for the supply of the electrical equipment for the Karnafuli hydro-electric project. In recent months officials of Pakistan and of the World Bank have discussed the question of finance to enable further expansion of Pakistan's power resources, but, as yet, there has been no official pronouncement of their outcome. The Karnafuli project takes its name from the river on which it is centred. The main site is about 45 miles upstream from Chittagong, where a dam is to be built and a power station constructed which will have an initial capacity of 90 MW. A further 30 MW will be added later, but there is scope for another 60 MW subject to the permission of the Indian Government, to flood an area at the foot of the Lashai Hills, which lie within their territory. The original report on the hydro-electric and flood control scheme was prepared in 1949 by the consulting engineers, Merz, Rendel, Vatten (Pakistan), at the request of the Pakistan Government.

Five Years Progress

"Not a bad record for five years" is the modest claim of the Damodar Valley Corporation in a report it has published outlining its work during that period. The Corporation is an autonomous body entrusted with India's largest multi-purpose project. In view of the vastness of the scheme and the difficulties which had to be overcome, the progress to date is really substantial. The inauguration of the Bokaro thermal power plant with its first 50 MW set, we noted earlier this year. It is stated that there have been unavoidable delays in delivering transformers from abroad, but the second and third generators will be in operation shortly, and provision for a fourth set has been made, as power supply contracts already finalised amount to 119 MW, with demands for a further 150 MW, which will only be met when the Maithon, Panchet Hill and Konar hydro-electric stations commence operating. The latter is expected to be functioning in November. Included in the first phase programme is the erection of 375 miles of 132 kV transmission line. The Corporation is obviously pleased at its timely placing of orders. Power is expected to be sold at an average of 0·66 anna per unit. On the increasing cost of the project the Corporation maintains that the rise over the original figures is not endemic. Also, the delay in appointing a chief engineer was unavoidable, for it was difficult to get a suitable man. In any event his absence in the early stages did not prove a great handicap, it is stated.

An Aid to Financing

All investments made in approved industrial undertakings are to be exempt from estate duty, the Pakistan Finance Minister has announced. Listed among the approved industrial undertakings are generation of electric power, and the manufacture of electrical equipment such as fans, lamps, motors, generators, and switchgear.

N.S.W. Position

Since mid-winter last year, 220 MW had been added to the output of the generating stations of the New South Wales Electricity Commission, Mr. H. G. Conde, chairman of the Commission, stated recently. All restrictions of the use of electricity, except for arc furnaces, were lifted on May 25 last, and blackouts had occurred since on a modest scale, but an unrestricted demand of more than 840 MW had been met. Plant added to the commission's supply system since July, 1952, included two 50,000 kW units at Pyrmont power-house, a 25,000 kW unit at Balmain and a 10,000 kW unit at Lithgow. Plant for an output of 90,000 kW to be installed before the end of the year included a fourth 50,000 kW unit being erected at Bunnerong power-house. But Mr. Conde is still anxious about the reserve plant position, for a very high proportion of plant in commission is long overdue for replacement.

No Relief for Sydney

Despite Sydney County Council's efforts to ward off an increase in the bulk supply charges made by the New South Wales Electricity, the Governor, at a meeting of the Executive Council a few days ago, has ordered that the 11% increase in charges operate as from July 1 (originally the increase was to apply from May 1). We noted last week that the County Council had been granted a writ of mandamus. But at the Executive Council's meeting Mr. Renshaw, Minister for Local Government, said he felt it was not necessary or desirable to appoint a person to hold an inquiry. The County Council had not, in fact, questioned the accuracy of the commission's figures upon which the increased charges were based, he maintained. The whole contention related to matters of Government policy and an inquiry would not serve any purpose of public interest.

PERSONALITIES

IN THE INDUSTRY

Mr. C. W. A. Priest, B.SC.(ENG.), A.M.I.MECH.E., M.I.E.E., has been appointed chief generation engineer (construction) in the South Wales Division of the B.E.A. He is now generation engineer (construction) in the Southern Division. Mr. Priest expects to take up his new duties in four to six weeks' time, with headquarters at Cardiff. As a result of this appointment he has had to resign from the Southern Centre of the I.E.E., and at the last committee meeting **Commander (L) C. V. Robinson,** R.N., was elected chairman of that centre for the next session.

Mr. James Bennett, contracts manager of A. Reyrolle and Co. Ltd., has been appointed a director of the company. Educated at Brockley School, London, and Rutherford Technical College, Newcastle-upon Tyne, Mr. Bennett joined the company as an apprentice in 1920 and was later transferred to the sales department. On the reorganisation of that department he was appointed assistant contracts manager, and became manager of the Department in 1944. For many years he has represented the Company on various committees and is a member of the Committee of the North-Eastern Centre of the I.E.E.

Mr. J. Bennett

Civil engineer to the London Division, B.E.A., **Mr. John Y. Danks,** B.S.C.(ENG.), M.INST.C.E., is resigning that position at the end of this month to become an executive director of Sir Wm. Arrol and Co. Ltd.

For the post of deputy station superintendent at Kingston 'A' and 'B' power stations, South Eastern Division, B.E.A., **Mr. A. W. Gillett,** A.M.I.E.E., A.M.I.MECH.E., has been chosen. He takes up his new duties on August 1. At present Mr. Gillett is generation maintenance engineer under the chief generation engineer (operation) at the Division's headquarters.

The directors of the Brush Electrical Engineering Co. Ltd. announce that the **Hon. A. C. Geddes** has requested that, in order that he may be free to develop his personal business interests, he should be released from the present agreements, whereby, his services are available to the companies of the Brush Group, and has tendered his resignation as a director of the company.

Mr. A. P. Harrison, senior maintenance engineer at Skelton B.B.C. station for six years, has been appointed deputy resident engineer at Singapore, British Far Eastern Broadcasting Service.

At the beginning of August **Mr. Ernest Hill,** A.M.I.E.E., is to take up his new duties as commercial officer of the Dumfries and Galloway subarea of the South West Scotland Electricity Board. At present he is district commercial engineer for the Wimbledon district of the London Electricity Board. Mr. Hill has had a wide and varied experience in the supply industry. Prior to nationalisation he was for a considerable time with the Hull Corporation Electricity Department, ultimately holding the position of sales engineer. After vesting day he joined the South Eastern Electricity Board as an assistant district commercial engineer and then went to Wimbledon to take up the post he is shortly relinquishing.

Mr. E. Hill

Mr. Stanley Finkle, deputy general manager of Sunderland Corporation transport undertaking, who is retiring after forty-five years' service, was recently presented with a silver tea service and a luncheon basket, by **Mr. N. Morton,** general manager, on behalf of the staff.

Managing director of the Westinghouse Brake and Signal Co., Ltd., since 1947, **Mr. Donald F. Brown** has resigned that position, and also his directorship of that company and all its subsidiary and associated companies. He is the son of the late Mr. H. G. Brown, who was the chief executive of the company. He had been in the service of the Westinghouse Brake and Signal Co. since 1919.

Station superintendent at Hammersmith power station, London Division, B.E.A., **Mr. A. C. Tedstone** is retiring on August 29. He has completed forty years service in the electricity supply industry, of which twenty-eight years has been spent at Hammersmith. Earlier he had served with undertakings at Hereford, Stockton-on-Tees, Portsmouth and West Bromwich.

Mr. A. Tedstone

The English Electric Co., Ltd., announce that **Mr. J. Parker** has been appointed manager of their Bradford works in place of **Mr. P. Evans,** who has left the company's service.

Elected as chairman of the Executive Council of the Association of Supervising Electrical Engineers for the ensuing year is **Mr. J. Flood,** ASSOCIATE I.E.E., technical director of Troughton and Young Ltd. Vice-chairman of the Association is to be **Mr. S. H. Harding,** A.M.I.E.E., and **Mr. E. J. Sutton,** M.I.E.E., is again honorary treasurer. Mr. Flood, who has been a member of the Association's Executive Council since 1941, was elected vice-chairman in 1942 (an office he held for two years in succession) and chairman in 1944. He was also chairman of the West London branch in 1947-48. Gaining early training at Paddington Technical College, he was employed by several electrical contracting firms from 1919 onwards, and joined Troughton and Young as supervising electrical engineer, being later promoted to his present position.

Mr. J. Flood

Appointed as district manager at Lyndhurst, No. 4 sub-area of the Southern Electricity Board is **Mr. M. Clissold** who now holds a similar post with the board at Yeovil. At the latter town he is to be succeeded by **Col. P. Thornton Wood,** D.S.O., M.C., T.D., A.M.I.E.E., who is district manager at Leek and Cheadle, Midlands Electricity Board. Mr. Clissold has been district manager at Yeovil since 1949, after a period as district executive officer at Salisbury. He had served at the latter city with the Wessex Electricity Co. since 1930, initially as assistant district manager, and from 1940 to 1948 as district manager there. Col. Thornton Wood has been district manager at Leek and Cheadle since vesting day. He started his career with the former Callender's Cable and Construction Co. in 1923, in the o.h. line dept. at the London Office, and joined the Northampton Light and Power Co. in 1930. His period with the Bedford Corporation undertaking was interrupted by war service after which he went to the North West Midlands Joint Electricity Authority in 1946 as mains superintendent. It is expected that he will take up his new duties in the autumn.

Mr. M. Clissold

Col. P. Thornton Wood

Sir Claude D. Gibb, C.B.E., D.SC., M.E., F.R.S., chairman and managing director of C. A. Parsons and Co., Ltd., who recently spent some weeks in hospital at Newcastle-upon-Tyne with a heart ailment, is now convalescing in the Lake District.

Two new appointments are announced by the South Wales Electricity Board. **Mr. W. P. Warren,** B.SC., A.M.I.E.E., formerly senior assistant, industrial supply, in the chief commercial officer's department at the head office of the Board, has been appointed section head, industrial supply, in the same department. He succeeds Mr. D. G. Gwyn, B.SC., A.M.I.E.E., who was appointed sub-area manager of the Board's Western sub-area earlier this year. The second appointment concerns **Mr. C. V. Ball,** formerly district commercial manager, district 347 (Cardiff East), who becomes commercial officer, Central sub-area, in succession to the late Mr. C. J. Martin.

Mr. D. Maxwell Buist, M.I.E.E., M.I.EX., Export Director of the B.E.A.M.A., has been re-elected Chairman of the Council of the Institute of Export for the year 1953/4.

Mr. Frank Haxell has been re-elected assistant general secretary of the Electrical Trades Union.

Mr. Walter Richards, senior director of Johnson and Phillips in Australia, and his wife, arrived at Tilbury last Monday on the *Strathmore*. He will be staying in this country for several months, and any friends or business associates who wish to contact him can do so at Johnson and Phillips Ltd., Victoria Works, Charlton, London, S.E.7. **Mr. C. Eric Stewart,** M.I.E.E. manager for Johnson and Phillips in India, Burma, and Ceylon, and **Mr. Stanley Badcock,** of Johnson and Phillips's South African subsidiary company, are also staying in this country and can be contacted at Charlton until the end of August.

OBITUARY

We regret to record the death, on July 19, aged 70, of **Sir Johnstone Wright,** M.I.E.E., M.INST.C.E., a director of British Insulated Callender's Cables, Ltd., and deputy chairman of British Insulated Callender's Construction Co., Ltd. Earlier he had been associated with the Central Electricity Board from 1927 until retiring in 1948, initially as deputy chief engineer, then as chief engineer from 1933 to 1944, as general manager from 1944 to 1947, and in the final year as chairman. Prior to joining the C.E.B. he had been city electrical engineer and manager at Belfast for five years, during which time a complete reorganisation was carried out and the Harbour power station constructed. In addition he was responsible for the preparation of a comprehensive scheme for

Sir Johnstone Wright

electricity supply throughout Northern Ireland—the foundation on which was built the Electricity Board for Northern Ireland. He had also been deputy city electrical engineer at Bradford, and had served with the Cleveland and Durham Electric Power Co.

Mr. E. Fawcett, M.I.E.E., F.C.G.I., who was chief engineer of the testing department with the former North Eastern Electricity Supply Co., Ltd., for many years, died recently at Riding Mill, Northumberland. His early experience was gained with the Croydon Corporation Electricity Departments' testing staff, and he joined N.E.S.Co. in 1903 in the position from which he retired in 1944. Initially the job was a very small affair of course, but by the time he retired, meter and instrument testing was numbered in over 100,000's. Mr. Fawcett had several patents to his credit. He had served as chairman of the I.E.E. Measurement Section in 1930-31, and was actively identified in discussions with the Electricity Commissioners in connection with the operation of the Electricity Meters Act, 1936, and also with meter standardisation. In addition, he served on various B.S.I. and E.R.A. Committees.

Mr. E. Fawcett

Mr. F. G. Curel, A.M.I.E.E., who was for forty years manager and engineer of the Witney Urban District Council Electricity Department, died on July 7 aged 78. On nationalisation of the industry he continued for a time as local engineer and manager with the Southern Electricity Board before retiring in June 1950.

Mr. R. M. W. Kullman, M.B.E., area sales manager of Measurement Ltd. (Electricity Division), died on July 2, aged 54. He joined the company in 1948 from Crompton Parkinson Ltd., after experience with other meter concerns. He was very well known throughout the electricity meter industry, and his many friends will deeply regret his passing.

The death took place in a Johannesburg motor accident on July 3, at the age of 26, of **Mr. J. E. Fisher,** chief charge engineer for the English Electric Co. Ltd., in connection with the construction of the Vierfontein power station, Orange Free State. He went to South Africa nearly a year ago.

Mr. F. Plutte, a director of Enfield Cables Ltd. and managing director of Enfield Rolling Mills Ltd., died on July 8, aged 45.

NEW LITERATURE

Controllers for Electric Motors

by H. D. James and L. E. Markle

BECAUSE this text book is American, much of its descriptive matter is in detail of little value to British engineers; but this consideration apart, it presents a most useful survey of the whole field of motor control gear. The early chapters, which describe control principles and components particularly, repay reading, and they include some notes on reading and making controller diagrams that many will find most helpful. Later in the book many control techniques are described in some detail, including rotating amplifiers and magnetic amplifiers. Throughout, the requirements of operating and maintenance engineers are kept well in mind, and there are helpful summaries of the advantages and limitations of the alternative methods described. To sum up, this is a book well worth the attention of any engineer interested in motor control: the American approach will clarify some familiar ideas, and perhaps introduce new possibilities. Published by McGraw Hill, 426 pages, 9 in. by 6 in. Second edition, price 59s. 6d.

The Switchgear Handbook, Vol. I.

Ed. by C. H. Flurscheim, J. P. A. Meldrum and E. E. I. Pilcher

THERE are three new editors for the second edition of this well-known volume, but its high standard of usefulness is unchanged unless, indeed, it is even improved. Once again the contributors are drawn from the staff of the Metropolitan-Vickers Electrical Co., and once again their object has been to assist the user of switchgear, rather than the designer.

Since the fruits of switchgear research have been plentiful since the 1938 first edition, considerable rewriting of the text has been undertaken to bring it up to date, but only one new chapter has been added. This is a valuable discussion of the interruption of a.c. circuits, which includes notably helpful sections on the rate of rise of restriking voltage and on the use of shunt resistors. The other chapters discuss basic design considerations and insulation problems, and describe contemporary types of h.v. a.c. circuit breakers, air-break c.p.s. fuses, air-break switches and instrument transformers. Final chapters discuss over-voltage protection and automatic voltage regulation.

The illustrations and the brief bibliographies appended to this chapter add greatly to the descriptive sequencies of this book. Published by Pitman, 245 pages, 8½ in. by 5½ in. Second edition, price 40s.

BOOKS RECEIVED

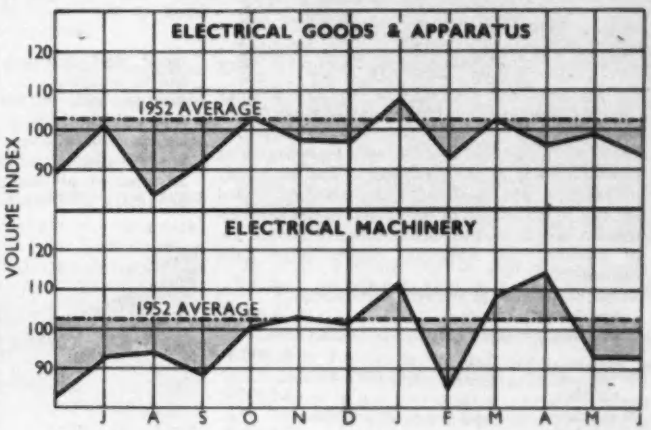
Whillans' Tax Tables and Tax Reckoner 1953-54, by G. Whillans, giving, at a glance, taxes for various rates, income tax rates and reliefs, surtax rates and national insurance contributions. Published by Butterworths, size 9¾ in. by 6¼ in. Price, for single copy, 5s. (reduced for bulk orders)

EXPORTS AND IMPORTS

EXPORTS VOLUME INDEX

The influence of the Coronation can be seen in last month's low value of exports in both electrical goods and apparatus and electrical machinery. In the first group, exports fell as indicated by the *Electrical Times* volume index, which stands at 93·5 compared with 99 for the previous month, both figures based on 1950 as 100. In value, exports of goods in this group amounted to £8,309,869.

For electrical machinery the picture is somewhat brighter, exports having remained constant over the last month. This is seen in the volume index which is 93 for both May and June (1950 = 100). Exports of goods in this group totalled £4,553,808 in value.



THE small decrease in the total value of all electrical goods exported during June, compared with the previous month, was probably due to there being one less working day. The reduction primarily affected the smaller type of apparatus, exports of the heavier capital equipment remaining about the same, with the convertors, transformers and rectifiers group retrieving the reduction suffered during May. Exports of electric washing machines during June amounted to £140,491 for machines not exceeding 150 lb in weight, and to £50,687 for the larger complete models.

Also, in addition to our table complete electric portable power tools to a value of £95,078 were sent abroad in the month.

Description	Exports Value Month of June			Imports Value Month of June		
	1951 £	1952 £	1953 £	1951 £	1952 £	1953 £
Telegraph and Telephone Wires and Cables—						
Submarine	8,100	6,280	234,737	—	—	—
Other	433,391	782,238	867,298	—	—	—
Rubber Insulated	443,590	667,465	467,044	—	—	—
Insulated, other than Rubber	1,076,206	1,107,440	1,336,250	—	—	—
Wireless Apparatus, including Valves	1,843,947	1,582,494	1,679,899	339,438	337,079	429,132
Telephone and Telegraph Apparatus	1,188,618	1,192,114	1,282,827	—	—	—
Electric Lighting Appliances, Accessories, Fittings and Parts:—						
Filament Lamp Bulbs	119,665	111,068	73,441	28,438	3,671	7,731
Other Descriptions	322,563	371,617	404,586	62,511	39,956	30,801
Batteries (primary)	223,385	160,535	141,427	—	—	—
Accumulators, Portable	347,676	307,015	231,684	—	—	—
" Stationary	42,179	113,667	37,226	—	—	—
" Parts and Accessories	85,783	66,202	38,468	—	—	—
Electrical Cooking and Heating Appliances	419,132	276,247	233,098	—	—	—
Ammeters, Voltmeters, etc., and Parts	105,919	94,742	136,224			
House Service Meters	108,434	195,244	58,996	46,563	46,943	69,743
All Other Instruments	96,527	100,365	155,055			
Electro-Medical Apparatus	40,567	29,114	40,530	—	—	—
X-Ray Apparatus, etc.	137,931	83,115	82,290	22,833	58,973	24,987
Insulating Materials	213,162	126,463	90,269	—	—	—
All Other Articles	489,895	546,940	618,520	163,107	172,476	161,111
TOTAL OF GROUP	7,446,670	7,920,365	8,309,869	662,890	659,098	723,505
Electrical Machinery:—						
Generating Sets, Diesel (not exceeding 200kW)	357,883	363,671	288,315			
" " " (exceeding 200kW)	121,251	209,229	115,122	38,763	46,817	52,285
Other Generating Sets	330,226	63,055	90,362			
Generators minus Prime Movers and Parts	314,114	341,244	639,768			
Motors	762,263	777,802	750,030	30,971	39,159	79,981
Convertors, Transformers, Rectifiers, Motor Control Gear, Switchgear, other machinery	1,943,483	2,354,901	2,721,624	14,546	29,440	67,055
Fans, Electrically and Power Driven	136,437	154,480	203,676	—	—	—
Vaccum Cleaners or Electrically Operated Appliances	536,690	274,851	313,980	—	—	—
TOTAL APPLIANCES AND MACHINERY	11,949,017	12,456,598	13,432,746	747,170	774,514	922,826

The BUYER'S *Column*

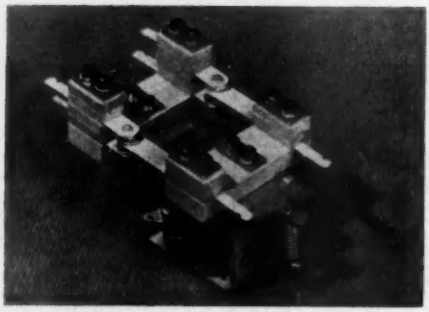
New High Voltage Relay

THE new Type 350 two pole change-over relay was designed by ELECTRO-METHODS, LTD., Caston Way, Stevenage, Herts, primarily for aerial switching, but since a very high degree of insulation has been achieved, it has obviously many other applications. The design was based on the firm's standard 400 Relay series and by using a new insulation material and wide spacing of contacts the following figures have been achieved:

Break down voltage between N/O contacts and moving blades	3,000V.
Break down voltage between N/O contacts	12,000 V.
Break down voltage between moving blades	14,000V.
Break down voltage between closed contacts and frame	7,000V.
Capacity between open and moving blade	5·5$\mu\mu$F
Capacity to frame when relay closed ...	4·0$\mu\mu$F
Operating time	13 m sec
Time off	14 m sec

The relay is being produced to operate on a.c. or d.c. standard voltages and will be available in approximately four weeks.

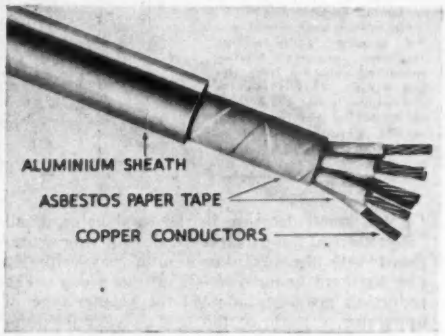
Design of the Type 355 relay was based on the 400 series



New Fire and Heat Resisting Cable

A NEW range of asbestos paper tape insulated cables has been developed by PIRELLI-GENERAL CABLE WORKS LTD., Southampton. These cables are suitable for use in circuits up to 660 V in situations where non-inflammability, maintenance of electrical properties under elevated temperatures, and non-ageing properties are required.

Copper conductors, which may be single or stranded, are lapped with a special quality asbestos paper tape. The cores are laid up, asbestos paper taped, and sheathed with a welded aluminium sheath (*Asbestal*) or, alternatively with a welded stainless steel sheath (*Asbesteel*). The smaller Asbestal cables have a cold-welded aluminium sheath with a small longitudinal fin, while the larger Asbestal cables have a corrugated argon-arc welded aluminium sheath, which has the advantage of flexibility similar to that of a lead



Displayed view of the new cable

sheathed cable, combined with sufficient stiffness in relation to weight to enable the distance between supports to be considerably greater than that necessary with lead sheathed cable.

The multicore cables have a constant insulation thickness between conductors, with a variable thickness between conductors and sheath. The conductor insulation thickness varies very little from 0·05 in. but, owing to the limited number of sheath diameters, considerably more than 0·05 in. thickness between conductors and sheath is used in many cases. Single core cables have all to be insulated to fit the nearest standard sheath and considerable variation above a 0·05 in. minimum consequently occurs.

The insulant is indestructible and the cable itself will continue to function at temperatures up to the melting point of the sheath. Since the insulant is dry, the cables are non-bleeding, rendering them eminently suitable for verticle runs which may be subject to overload or high temperatures.

Asbestal cables are available in most normal sizes between 1/·044 and 37/·103 (single-core), between 1/·044 and 19/·072 (twin-core), between 1/·044 and 19/·064 (three-core), between 1/·044 and 19/·052 (four-core) and between 1/·044 and 19/·044 (seven-core).

Asbesteel cables are available in most normal sizes between 7/·036 and 37/·083 (single-core), between 3/·029 and 19/·052 (twin-core), between 3/·029 and 19/·052 (three-core), between 1/·044

and 19/·052 (four-core) and between 1/·044 and 7/·052 (seven-core).

Telephone cables of multiple twin or quad construction can also be supplied.

Dimplex Gas-tight Radiators

IN our note last week about these gas-tight radiators an error was made in the paragraph referring to sizes of the column type radiators. These are only available in 1½ kW and 2 kW sizes.

"Lincass" Automatic Iron

A NEW electric streamlined automatic household iron, Cat. No. 444, is the latest addition to the "Lincass" range of streamlined household appliances, made by H. CASSIRER, LTD., 31 Pinner Road, Harrow, Middx.

The new Lincass iron has style

A new feature of the "Lincass" '444' is the pancake-shape, over-size, easy-to-read selector dial for ready heat-control for all materials. An improved version of the firm's 'direct-action thermostat,' is incorporated in the design.

The easy-grip, streamlined Bakelite handle of the '444' has a left- and right-handed thumb rest, whilst the chromium-plated sole plate has a low-angle level for ironing well under buttons and folds.

The '444' iron is well balanced for ease in ironing with a medium weight of 4½ lbs. The extra long flexible cord is mounted in a rubber sleeve to prevent fraying and kinking.

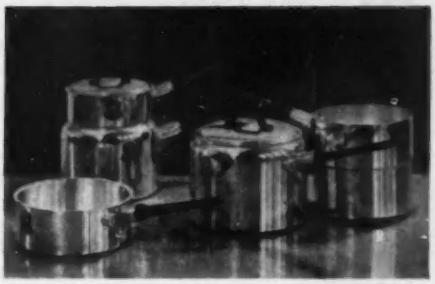
In common with other electric appliances marketed by the firm the "Lincass" '444' automatic iron is fully guaranteed for 12 months. Loading is 750 watt. Models are available for all voltage ranges. Cat. No. 444, A.C. only, 39/6d.; Cat. No. 446, A.C./D.C., 42/6d.

New Pyramid Utensils

TWO new developments in the Pyramid range of cooking pans designed especially for use with electric cookers are announced by HAGUE AND MCKENZIE, LTD., Pyramid Works, Birmingham.

The first is a new porringer so designed that the opening of both the top and bottom pans is identical so that the single lid can be used with either; the former bulge seating is replaced by a single step. This new porringer is made in two sizes of 3 pints and 5 pints. Prices remain as before at 29s. and 34s. 6d. respectively.

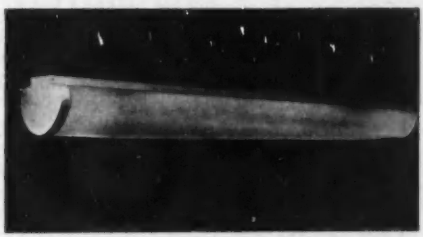
The second appliance is the new shallow milk pan. Its principal feature of design is that it is calculated to effect the maximum coverage of the hot-plate. Trials of this model are said to have proved that it is possible to boil a given quantity of milk in two-thirds the time taken to boil in a conventional deeper all-purpose saucepan.



"Pyramid" porringer can be used in three forms. The milk saucepan is seen in the left foreground

Produced in a 2 pint size only, 6¼ in. diameter and 3 in. deep, the pan embodies a ground flat base, the new non-drip rim (see ELECTRICAL TIMES, 11 June, p. 1116), a heat-resisting handle and highly-polished finish. The new pan will retail at 15s. 3d. or 18s. with fitted lid.

A "natural" Crinothene diffuser is fitted to the new Crompton AQ2531 fitting



Crompton Diffuser Fitting

INTRODUCED by CROMPTON PARKINSON LTD. Crompton House, Aldwych W.C.2, is a new fluorescent lighting fitting AQ2531 which, designed to harmonise with modern interior decoration, is equipped with a "natural" colour Crinothene diffuser with metal end plates finished in stoved cream enamel.

Suitable for close ceiling mounting or pendant mounting using the suspension set (Cat. No. A.109) the fitting is easily installed, the only connection required on site is that of the mains lead to a readily accessible terminal box. Relamping and access to starter switches is obtained by freeing one side of the Crinothene diffuser.

List price of the fitting is £6 16s. subject to purchase tax of 18⅔%. Complete with switch start gear the fitting costs £13 3s. plus purchase tax on price of fitting or £15 12s. 8d. plus purchase tax on fitting price for complete unit with snap-start gear.

D

Electrical Testing of Concrete Mix

NEW S.G. WATER-CEMENT RATIOMETER PROVIDES EASY AND ACCURATE METERING

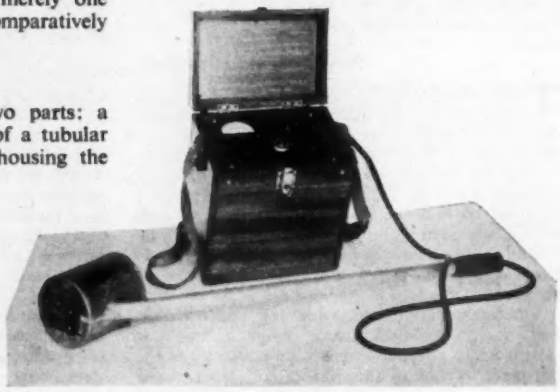
THE water-cement ratio is the fundamental factor controlling concrete strength, but until now it has been impossible to measure it swiftly and accurately as a matter of routine at the mixer. After five years of research, followed by many months industrial testing, the Civil Engineering Laboratories Ltd., at Sunbury-on-Thames, have produced a water-cement ratiometer for testing concrete during its actual mixing.

Compact, robust, portable, with only two parts together weighing 24 lb, a semi-skilled workman can be taught to use it in an hour. Actual testing operations take less than a minute, thereby causing no hold-up to production. Its use eliminates wastage of time, labour and materials through incorrect mixes.

Previously devised testing methods provide only a rough guide to quality or involve the use of skilled technicians. If the testing has to be done on the site, a mobile laboratory has been necessary. Also considerable time elapses before the results are available. The "S.G." Ratiometer, by making merely one simple electrical measurement, is comparatively instantaneous in operation.

The Instrument

The instrument consists of two parts: a prodder, or canister, at the end of a tubular handle, and an instrument-case housing the electrical circuits, control panel and batteries. On the base of the prodder are two electrodes near together, while inside is housed a small vibration unit.



The instrument and prodder are shown in the illustration

On the control panel is a dial with a scale divided into "Too Wet," "O.K.," and "Too Dry" zones; a switch with "Off," "Calibration" and "Test" positions; an "adjust" knob and a rheostat with a "0 to 100" scale of code numbers. The batteries are housed in the base of the case and a multiple, shock-free, female plug attached to a length of cable is inserted into the plug-hole in the side of the case to connect the prodder. When the lid is raised, a warning light indicates that the prodder is in circuit.

Method of Use

The prodder is partially immersed in the concrete after switching on. The vibrator causes the cement and water, and any fine

particles of aggregate, to separate out into a slurry round the electrodes. The prodder is then withdrawn until the base is on the surface of the concrete. As the slurry is composed of cement and water in their true ratio, the value of the current passing between the electrodes through the slurry is a measure of the amount of water present. This current is indicated on the dial denoting the condition of the slurry.

In practice a batch of concrete of precisely the water-cement ratio stipulated by the designer is made from the materials to be used on the site. The adjusting knob, with the prodder in the air, is turned until the dial's pointer registers zero. Discrepancies due to the charge condition of the battery are thus eliminated. The switch is turned to "Calibrate" and with the prodder immersed in the calibrating mix, the "code number" knob is turned until the pointer remains steady at the centre of the "O.K." zone.

The code number thus obtained is noted. On site, the prodder is immersed in the mix in the mixer. The switch is turned to "Test," and the "code number" knob turned to the already ascertained number. The condition of the mix will be indicated by the zone in which the dial's pointer comes to rest. The requisite materials may then be added to bring the mix eventually to "O.K." if this is necessary.

Results of Independent Testing

The Report of Special Investigation No. R.S.J. 1498 of the Building Research Station of the Department of Scientific and Industrial Research states: "The object of the tests was to evaluate the suitability of the instrument for indicating if the water-cement ratio of a sample of concrete is equal to, or is greater or less than, a predetermined figure. The tests showed that within certain ranges of water-cement ratio, the instrument compares correctly with the water-cement ratio in a sample of concrete with that in a made-up sample of known water-cement ratio when the difference is 0·05 or more.

"The tests also showed that for a 1:1:2 mix the extent of the 'O.K.' zone on the instrument corresponds to a difference of the water-cement ratio of from 0·04 to 0·08, depending on the water-cement ratio of the tested concrete."

I.E.S. meet at Nottingham

NOTTINGHAM University was this month the venue for a new venture of the Illuminating Engineering Society. This was a Midlands Area Summer Meeting, organised by the centres of the society in the Midlands with the help of the council.

A full programme was arranged for the day beginning with an address by the president of the society, Mr. W. J. Wellwood Ferguson and including two technical papers—"Colour in Pictorial Art" (Professor H. Cotton) and "Eye, Nerve and Brain" (Mr. H. Asher, of the Medical School, University of Birmingham).

Colour and Art

Professor Cotton, who said that his interest in colour resulted from a search for some subject for further study different from electromagnetic machines, entertained his audience with comments on the works and style of various artists. All of this led up to a discussion in scientific terms of the limitations imposed by available media, and of their effect on works of art.

Mr. Asher began his address by suggesting that a lecture describing today's knowledge of the function of eye, nerve and brain was handicapped by lack of understanding of the essential nature of the processes involved. All that can be conveyed is a description of the experiments which are being carried out and the results which are found. In many ways engineers, including illuminating engineers, are a long way ahead of physiologists and psychologists. However, many diverse, complex and little-understood phenomena are gradually becoming sorted out into a few categories. The chief unifying concept at present is that of inhibition.

The social events that add so greatly to the value of a summer meeting were not neglected, and a luncheon and dinner were arranged. Mr. P. L. Ross, chairman of the Nottingham centre, presided at the former, at which speakers included the president of the I.E.S. and the Lord Mayor of Nottingham. In the evening Mr. Wellwood Ferguson was in the chair, and the speakers included Mr. H. C. Weston, hon. secretary of the society, and the readers of the conference papers.

Special interest was added to the meeting by its taking place on the silver jubilee, to the very day, of the opening of the Nottingham University buildings by his late Majesty King George V.

The WEEK in NEWS

Belfast Settles Boiler Controversy

Electricity Committee will adhere to original Tenders

BY eight votes to two the Belfast Corporation Electricity Committee decided last Thursday not to advertise for tenders for plant for the new Power Station West, but to adhere to their original decision to place the contracts with C. A. Parsons and Co. for two 60 MW turbo-alternators, etc., and with Babcock and Wilcox, Ltd., for seven boilers and ancillary plant. The matter was due to be dealt with at a special meeting of the Council yesterday. We reported on July 9 that the Electricity Committee proposed to seek tenders for the boiler plant, having been told on June 22 that Mitchell Engineering, Ltd., had said their price for supplying such plant would have been at about 10% below the price which the Committee accepted in May.

At last week's meeting the Committee considered a letter from the Permanent Secretary of the Ministry of Commerce. This was concerned chiefly with the prospect of delay in commissioning of the plant if fresh tenders were sought. In the Minister's view, the letter went on, the fact that, subsequent to the announcement of the lowest tender price, a tentative offer of a lower price from a firm which had not been invited to tender is not relevant to the correctness or otherwise of the original decision to confine the invitation to five contractors selected on the advice of the consulting engineers.

In the circumstances, the Minister would regard himself, if he were in the Council's position, as sufficiently justified both in relation to price and the selection of contractors, in acting on the advice of the consulting engineers, the letter adds.

The Minister goes on to emphasise the view that the advertising of a contract after disclosure of the amount of the lowest tender already received, and of the name of the firm who submitted the tender, would be a course much to be deprecated.

Private Imports of Copper Planned

LAST week the Board of Trade announced arrangements to provide for the private purchase of unwrought, refined and blister copper in the form of anodes, bars, billets, cakes, cathodes, ingots, ingot-bars, slabs and wire bars. These plans will be operative as from August 5 when dealings reopen on the London Metal Exchange. Members of the Exchange who take part in the Bank of England Exchange Control Scheme will be granted open individual licences valid for any source. Applications will also be considered from those wishing to import large quantities other than through the Exchange, although returns for the ensuing 12-month period will be needed. All applications should be addressed to the B.o.T.'s Import Licensing Branch, 43 Marsham St., S.W.1.

MORE WAGES FOR MANUAL WORKERS

MANUAL workers in the Electricity Supply Industry are to get an increase in pay of 1½d. an hour, while all grade rates of foremen contained in schedule E of the National Agreement are being raised by £15 per annum. These increases, announced by the National Joint Industrial Council for the Electricity Supply Industry, take effect from the next full pay period. Between 120,000 and 140,000 workers are affected. The claim for a substantial increase for manual workers was first made in May.

Industrial Injuries

THE National Insurance (Industrial Industries) Bill was before the House of Commons last week, and read a third time. Clause 3 of the Bill should be noted as it makes provisions about benefit. Under the principal Act disablement benefit can be paid only if the loss of faculty is assessed at 20% or more. Those provisions are revoked and under the clause disablement benefit will be allowed for any period during which the disablement is assessed at 1% or more, whether permanent or not. The period during which only injury benefit can be paid has also been redefined.

The First Half-Century

The map and directory of automobile charging stations now being prepared by the ELECTRICAL TIMES is nearing completion, and when published will contain upwards of 700 entries. The growth in the number of charging stations during the last year or so is remarkable, and new stations are being opened every week in various parts of the country. Although early this year it would have been difficult for any ordinary electric vehicle to have travelled, say, from London to Edinburgh either by the east or west coast routes, such a journey would now be quite a simple matter, charging stations being available on both main roads at frequent intervals.—*From our issue of July* 23, 1903.

How Farmers can Help Rural Development

DURING the course of the Royal Show at Blackpool, Sir Joseph Hallsworth, chairman of the N.W. Electricity Board, took the opportunity to discuss rural electrification with representatives of farming and electricity supply interests. Situated as they were in a popular holiday resort, Sir Joseph emphasised that connection of farms for the national good would always be given priority in the allocation of extra capital, over premises of tourist interest. He warned his audience, however, against expecting any large increase in development as the Area already had an excellent record.

The chairman went on to echo the secretary of the Lancs. branch of the N.F.U.'s comment that the greatest help given to rural electrification schemes would be for all persons in the district to collaborate to make the supply worthwhile. He stressed that farmers should be prepared to use electricity to the fullest possible extent on the farm and so guarantee the revenue which would make worthwhile the extensive capital outlay incurred.

Coronation Lights in Hong Kong

ALTHOUGH our own Coronation decorations have now disappeared, the festive spirit did not die so long ago that we cannot comment on the decorations which were put up in other parts of the Queen's Dominions. Details of those which festooned Hong Kong are to hand this week, carried out by Jardine Engineering Co., agents on the island for Thorn Electrical Industries Ltd. Most effective was the 26 ft banner comprising two "ladders," each of 104 red, white and blue 5 ft 80 W lamps. A crown and cypher were superimposed and the whole was surmounted by a flaming torch. This feature dominated the Kowloon Ferry Concourse.

Another attractive decoration was the huge crown on top of the Hong Kong and Shanghai Bank Building. It was 27 ft high and 35 ft in diameter, and was illuminated by 1,800 pigmy lamps. Letters of the royal cypher, also on the building, were 24 ft high and lighted by 1,200 lamps. A further 2,600 15 W lamps outlined the Bank building.

Power for Rural Wales

OF the extra allowance provided for the Area Boards for rural electrification, the South Wales Electricity Board has been allocated an extra £90,000 this year, Mr. L. Howles, chairman of the Board, stated at a meeting of the Area Consultative Council last Friday. The Board had already budgeted to spend £310,000 on rural development, and in addition £502,000 had been set aside for ancillary works, making the total now to be spent £902,000. In all, the Board has been allocated £3,190,000, compared with £2,250,000 in 1951-2. In the five years since vesting day the Board has connected 1,544 farms.

He also has hopes of securing extra sums for developments in urban areas, for there are still people living in places like Port Talbot, Merthyr, Barry, and Neath who are still without a supply.

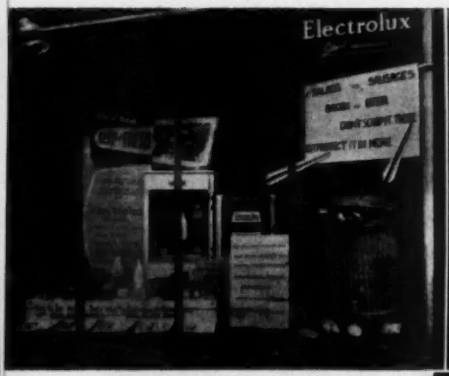
U.K. Contracts for Zanzibar Project

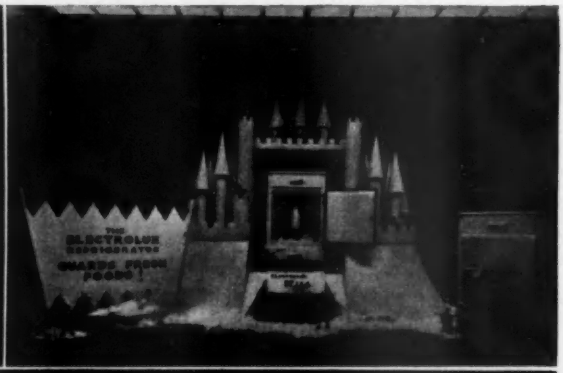
CONTRACT for the completion of the new 11kV a.c. distribution scheme in Zanzibar is being carried out by the English Electric Co. Reference to the £250,000 scheme to modernise the electricity supply undertaking was made in our March 26 issue. The programme involves the erection of a new power station at Saartein and the conversion of the distribution system from d.c. to 230V a.c. Sub-contractors are Enfield Cables, Ltd., who are supplying and laying the underground cables and overhead lines. Value of this part is £65,000.

TARIFF SOUGHT FOR CHURCHES AND SCHOOLS

THE question of churches, schools and institutions was discussed at last week's meeting of the Southern Electricity Consultative Council at Reading. This council has already given much attention to the suitability of various tariffs to these establishments and a resolution has now been approved asking the Board to separate the non-commercial group from commercial consumers, and to present to them a separate tariff for the first category for consideration.

"Ladders" of coloured fluorescent tubes were principal feature of this Coronation display in Hong Kong which overlooked Kowloon Ferry





Electrolux Window Display Competition

Two displays tied for first place in the Central London region of the Electrolux window display. Totally opposite in their themes, they nevertheless are considered by Electrolux Ltd. as first-class material in support of refrigerator sales. Left is the display by J. H. Dicks, of Fulham, and right, that produced by the London Electricity Board Display Department at Roehampton. The lower photograph shows the display by South-Western Board's Torquay service centre, which gained first prize in the Western region

Deep Freezers and P. Tax

THE question of liability to purchase tax of deep-freeze cabinets has recently been the subject of discussions between H.M. Customs and Excise and the British Refrigeration Association.

These cabinets are designed for deep-freezing foods or storing frozen foods and operate at temperatures at least 32° F below the minimum level of an ordinary domestic refrigerator.

It has now been decided to regard as chargeable all such deep-freeze cabinets with capacity up to 12 cu ft and which have one or more doors in the side or front or one or more lids, either being hinged to the body of the cabinet.

Commercial cabinets, usually styled ice cream conservators, are fitted with "plug type" or "flip-flap" lids covering the opening in the top surface of the cabinet and are not regarded as chargeable with purchase tax. Flip-flap lids are a small double type of "plug" lid normally hinged in the middle. Both types of lid have vertical seals and are without means of attachment to the cabinet other than by their own weight.

Studying Production

AN Institute for Engineering Production Studies has been opened at Edgbaston, Birmingham. It will be part of Birmingham University and has been established with an endowment of £54,000 from Joseph Lucas, Ltd. Residential courses, which will be given for senior production executives, will deal mainly with the study of engineering production and management principles. It is one of the first to be established in this country although there are a few similar institutions in the U.S.

OFFICIAL PUBLICATIONS

NATIONAL INSURANCE (Industrial Injuries) (No. 2) BILL. Before House of Commons. (See page 174.) H.M.S.O. 6d.

MIN. OF SUPPLY SPECIFICATION. Govt. Dept. Electrical, No. 5. Telephone Cables. H.M.S.O. 2d.

STATEMENT OF GUARANTEE. Given by Treasury on loans proposed by B.E.A. Commons Paper 209. H.M.S.O. 2d.

COPPER, LEAD AND ZINC DISTRIBUTION (REVOCATION) ORDER. S.I. 1082. H.M.S.O.

BRITISH STANDARDS B.S. 1989 : 1953. Memorandum on values of the properties of high-conductivity copper.

RADIO RESEARCH BOARD. Report of the Director. H.M.S.O., price 2s. (See page 152.)

INDUSTRIAL COAL CONSUMERS COUNCIL; DOMESTIC COAL CONSUMERS COUNCIL. Annual reports. H.M.S.O.

DRAFT COAL MINES (ELECTRICITY) (EARTHING SYSTEMS) GENERAL REGULATIONS 1953. H.M.S.O. Price 2d.; and M. OF F. AND P. SAFETY CIRCULAR No. 204, explaining the Regulations, H.M.S.O., price 2d. (See page 156.)

European Power

FRUITFUL co-operation between European power-producing countries is again reported by the U.N. Economic Commission for Europe. Sixteen countries represented at a meeting of the Commissions Committee on Electric Power unanimously adopted a recommendation for overcoming difficulties which arise when rivers of mutual interest to two or more countries are to be developed.

Amongst new work undertaken by the Committee is a survey of depreciation policies adopted by electric companies. The group of experts studying rural electrification are going to look into the possibility of creating an international centre for the documentation and co-ordination of research in rural electrification.

Secretariat reports on electrical power developments are to become annual publications, and a study is being prepared of trends in electricity production and of forecasting techniques. Projects being dropped include studies of the economics of pumped storage.

This tenth session was presided over by Mr. P. Smits of Belgium. New officers are Mr. Ake Rusck (president of Swedish State Power Board) as chairman, and Messrs. S. Han (Yugoslavia) and Visentini (Italy) as vice-chairmen.

The National City Bank of New York, in Waterloo Place, London, was recently modernised and the lighting installation has greatly enhanced the premises. 200 W tungsten lamps are let in the ceiling above louvered fittings, the sides of which were pierced with the American star. These were supplied by Courtney Pope (Electrical) Ltd. Architects were C. Howard Crane and Partners

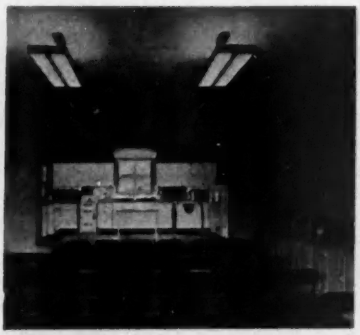
Fluorescent Lighting in London Shoe Shop

ONE of the most attractive lighting installations which has come to our notice in recent weeks was that carried out at the Oxford St. (London) shoe shop of Manfield and Sons. The work was done by E. Pollard and Co., Ltd., with electrical fittings supplied by Thorn Electrical Industries Ltd. Type of fittings chosen for the sales area was Atlas G.F.3080, seventeen being used on the ground floor and nine in the basement. Each accommodates two Daylight and one Warm White 5 ft 80 W double-life tubes and is complete with quickstart control gear. Concealed tubes have been used to illuminate recessed displays on the stairs while wall displays are spotlighted by 150 W lamps. The shop is open-fronted and in the windows there are 5 ft 80 W tubes with louvered panels supplemented by 150 W tungsten filament spotlights. Fluorescent tubes have also been hidden behind window ledges and fabric drapes.

Basement sales area of Manfield and Sons shoe store in Oxford Street showing fluorescent ceiling fittings and wall displays

Linesman awarded £3,080 Damages

A LINESMAN who fell 35 ft while cleaning insulators on a tower at a Rotherham substation two years ago was awarded damages of £3,080 and costs for injuries last week. The linesman sustained a fractured skull and right arm, but was held partially to blame, and in fact, Mr. Justice Jones said he would have awarded damages of £4,620 had this not been the case. The judge said a chargehand did not take enough trouble to see that the ladder was properly fixed and the accident was due to negligence, for which the defendants, the B.E.A., were liable. The plaintiff was given to understand that the ladder was all right because he knew the chargehand was putting the snatch block and rope in position, but this did not absolve him from taking the necessary precautions.



Bermuda has been in the news a lot lately. Shown here are the new showrooms of the Bermuda Electric Light Co. Left is the cookery demonstration theatre and right the service counter. The Company are agents for the G.E.C.

C.A.B.M.A. Guide to Anglo-Canadian Trade

ONE of the most important factors in our economic recovery has been and still is the volume of trade with the N. American continent. As has been reported on numerous occasions in these columns, Canada, more so than the U.S., has a rapidly expanding market for our goods, and several schemes to increase our exports to the Dominion have been referred to. Thus it is a pleasant task to be able to report yet another aid to British manufacturers, this in the form of an 800-page volume published for the Canadian Association of British Manufacturers and Agencies by Kelly's Directories, Ltd., and Iliffe and Sons Ltd. Briefly, the book is a buyer's guide to British products for the Canadian businessman.

The book has been produced in six sections. The first is a Buyers' Guide giving an alphabetical list of British products in Canada with the names of suppliers classified under product headings. Next comes a section devoted to advertisements, which is followed by an alphabetical Directory of British Manufacturers and Distributors. Two further sections enable products and their sources of supply to be identified from their Proprietary names and Trade Marks. A final section has been devoted to a French-English Glossary of product headings.

E.B.U. Station at Mons

A RECEIVING and Measuring Station was officially inaugurated at Jurbise, near Mons, Belgium, yesterday, we have been informed by the European Broadcasting Union. This new station will facilitate the task of studying the situation in various broadcasting wavebands. It will also contribute to technical research work undertaken by the Union to improve general reception conditions. The B.B.C. have been members of the Union since its inception in 1950.

Russian Cable Contract

IN our report last week of the Earl of Verulam's visit to Moscow, we erroneously described his Lordship as chairman and managing director of Enfield Cables Ltd. This was, of course, incorrect. He is managing director of the company but not chairman.

Congress in Turin

AS reported in our February 19 issue, the fifth international Mechanical Engineering Congress is to take place at Turin between October 9 and 15. We have now received the preliminary programme of the congress from the British Engineers' Association who are representing U.K. interests on the organising committee. Apart from the usual business sessions, Saturday and Tuesday have been set aside solely for working sessions. A large number of factory visits have been arranged on Monday and Wednesday mornings. Theme of this year's congress will be "Production and Assembly Methods for Components in Mechanical Engineering."

COMMONS DEBATE ELECTRICITY CHARGES

REPORTS from the south-west during the past week or more indicate that M.P.s in the area are considering bringing the question of electricity charges throughout the country before the House of Commons. Chief instigator of the debate is understood to be Mr. W. A. Wilkins, who represents Bristol South. He maintains that S.W. England area is regarded as the Cinderella of nationalised industries because of the predominance of agriculture, and, he asserts, charges are the highest in the country. Mr. Wilkins is hoping that one of the few remaining Opposition supply days will be set aside for such a debate.

Cable Error Caused Lost Contract ?

AN error made in the transmission of a cable from England to Canada caused the company to lose a contract for which it had tendered. That is the allegation of Newage (Canada), Ltd., who is claiming $71,750 damages from Canadian Pacific Telegraphs. The former company maintain that an English firm had sent a cable quoting prices on items on which Newage (Canada), Ltd., was tendering. A five-word error in the cable resulted in the company quoting prices much higher than they should have been, and the tender was not accepted. The action is to be heard in the Superior Court.

Effects of Power Stations On Waterways

A THERMO-HYDRAULIC model to study effects of power station operations on waterways is among equipment installed at the hydraulic research laboratory built by the Docks and Inland Waterways Executive at Southall, Middlesex. The laboratory was opened by Lord Hurcomb on Friday. The model has been constructed to the scale of 36 ft to a mile and was designed to investigate water temperature and atmospheric conditions. It followed a proposal last year to build a waterside power station on one of the Executive's waterways.

The model is operated in the same conditions as those prevailing on the actual site.

NEWS IN BRIEF

Opening meeting of Southampton Electric Club will take place at Polygon Hotel on September 4.

S.-Eastern Area Final of the Electrical Industries National Golf Championship will take place tomorrow (Friday) at the East Brighton Golf Club.

Submarine Cables Ltd. have presented the Officers' Mess of the P.O. cable ship *Monarch* with the latest edition of *Encyclopædia Britannica* to commemorate the laying of the Netherlands-Denmark telephone cables in 1950.

A thousand workers of Oldham and Son Ltd. invaded Blackpool recently for their annual outing.

Feature of E.D.A.'s stand at the Royal Welsh Show opening on Tuesday will be a complete electrical commercial catering kitchen. Special demonstrations will be held throughout the Show.

Over 200 parents attended the Apprentice Association's annual parents' day at the British Thomson-Houston Co.'s Willesden works on July 4.

Iron and Steel Institute have made arrangements to hold a special meeting in Holland between September 30 and October 7.

Rheostatic Co.'s Sports Club recently entertained their opposite numbers of Igranic Electric. This is an annual meeting and this time the cricket trophy went to the visitors and the tennis cup to Rheostatic.

Questions in Parliament . . .

Excess Profits Tax

Mr. D. Marshall asked last week whether the time limit within which repairs deferred from the Excess Profits tax period, and still qualify for relief, could be extended. Mr. Butler said he had considered the matter carefully. That time-limit would have expired in 1949 but it had already been extended twice. By next March those liable to the tax would have had seven years in which to carry out repairs. It was important to settle all E.P.T. liabilities as soon as possible and he regretted that no further extension for carrying out repairs could be granted beyond March 31 next.

Solid Fuel Appliances

A number of questions were asked last week about solid fuel appliances, arising from the subject of the threatened shortage of house coal. In a written answer Mr. Marples stated that local authorities had been asked to ensure that appliances installed in new private houses were high-efficiency solid fuel types. He added that the installation of recommended appliances was required in all new local authority houses.

In reply to another question Mr. G. Lloyd agreed that there was scope in the Stirling and Falkirk foundry industry for producing fuel-saving grates and similar appliances. He also assured the House that the campaign to encourage the installation of such equipment was being constantly extended.

Rural Schemes in Yorkshire

Replying to a question by Sir L. Ropner, the Minister of Agriculture stated that 40% of farms of over 5 acres in Yorkshire were connected to the mains by March 31 last. He added there were about 2,590 outstanding applications from farmers in the county.

Retail Sales Tax

The introduction of a sales tax to replace the existing Purchase Tax, was suggested by Mr. Gower. Asked if he had considered the advantages of such a scheme, Mr. R. A. Butler said he was fully satisfied that it would not be advantageous or practicable at this stage to replace P.T. with a retail sales tax. He said the suggestion was considered before the inception of purchase tax and the possibilities had been reviewed many times since.

Monopolies Commission

On Friday last the Monopolies and Restrictive Practices Commission Bill passed its Committee, Report and Third Reading stages in the Commons. No important alterations were made in the provision for two deputy chairmen for the Commission, and for the recognition of a panel system for working. In the course of the Committee debate, the President of the Board of Trade resisted an opposition amendment calling for the number of deputy chairmen to be four. He stated that it would be wrong to suppose that the Commission can be built up to its new size of 25 members in a short time.

Railway Electrification

The Minister of Transport was asked last week the estimated costs of electrifying the lines from Liverpool Street to Chingford and Enfield and from Edmonton to Cheshunt. He replied that no separate estimates were available.

Electric Supply News . . .

Belfast

The Corporation Electricity Committee has recorded its appreciation of the services of the acting city electrical engineer, Mr. R. P. Watson, and his staff during the power failure earlier this month. Reporting to the Committee, Mr. Watson stated that the faulty component had been removed for laboratory examination. He recalled that a month previously the Committee had accepted his recommendation to adopt a scheme of protection improvements on the 33 kV switchboard at the East power station at a cost of £3,710. This should assist in avoiding any future trouble.

Cardiff

In an effort to minimise the grit nuisance at Treforest Trading Estate, alleged to be caused by the Upper Boat power station, the East Wales Committee of the Welsh Board for Industry is to ask the National Coal Board to supply better quality coal to the power station. This decision was taken at a meeting of the committee recently, after Mr. H. J. Bennett, the divisional controller, had explained that coal being supplied to the station had an ash content of 20% to 23% compared with an average of 5% to 10% of pre-war coal. Mr. Bennett claimed that the B.E.A. had already taken vigorous action in combating the grit nuisance; they had spent £51,000 on plant since 1948 and were going to spend another £15,000. New plant at the power station was the final answer to the grit problem, he stressed, but meantime the Authority thought the National Coal Board could help in improving the quality of coal supplied to Upper Boat.

Glamorgan

A suggestion that the B.E.A. is investigating the possibilities of a site at The Leys, Gileston, St. Athan, for the erection of a new power station, has drawn forth some protests in the area. The matter was the subject of a question in the House of Commons recently (see our July 16 issue). It is alleged that 135 acres of good agricultural land and valuable amenities, including the Barry Golf Club, would be destroyed.

Middlesbrough

The North Eastern Electricity Board is considering the reinforcement of a number of substations in the south-east of the town to make provision for future housing areas outside the present borough boundary. A number of sites for new substations have been suggested to the Board, but various difficulties have arisen owing to technical problems and the high cost of the cables needed for the work. The Board is planning the construction of a larger 66 kV substation in Marton Road adjoining the existing substation. A site 138 ft by 118 ft is required. This will accommodate a substation and outdoor type switchgear, transformers, etc. The Town Council has agreed to lease the land in question and the Board is to be asked to screen the proposed substation, etc., with trees and shrubs.

North Eastern

At a meeting of the Consultative Council of the North-Eastern Electricity Board at Newcastle-on-Tyne, it was reported that during the months of March, April and May, 75 new substations had been put into operation. These included 18 in the Tyne sub-area, 10 in the Wear area, 15 in the Tees area, 15 at York, and 17 in the Harrogate district. During the same period the Board commissioned 99·3 miles of cables and mains, while 66 farms were connected compared with 90 in the corresponding period of last year. Twelve villages were also brought on supply. During the period under review the Electricity Board approved estimates amounting to £1,359,098, including supplies for 113 housing and 73 rural schemes. The Board has made arrangements for each service centre to display a list of names and addresses of registered electrical contractors.

S.W. Scotland

The 750,000th consumer was connected by the South West Scotland Electricity Board last week. The occasion was marked by a ceremony at Hamilton at which the Provost, Mrs. M. S. Ewart, formally connected the supply by closing the main switch at the consumer's premises.

LIGHTING SCHEMES

Bilston.—The Public Works and Estates Committee is making provision in its 1954-55 estimates for class A lighting in Stowheath Lane and Ettingshall Road.

Edmonton.—T.C. is recommended to invite tenders for improved lighting on the Great Cambridge Road between Enfield boundary and the junction with North Circular Road.

Kidderminster.—Borough engineer is preparing a scheme for the electrification of street lighting.

Malvern.—In spite of strong representations, the M.o.T. has stated that the scheme for improved lighting of the main trunk road must be deferred until 1955-56.

Staines.—The M.o.T. has informed the Council that the financial situation will not permit the erection of new lighting for the full length of the trunk road through the urban district. The Ministry has suggested a portion only be dealt with at first, at a cost of about £6,000.

Sunningdale.—The scheme of the parish council for converting street lighting from gas to electricity has been approved by Berkshire C.C.

Wembley.—The Council is to seek M.o.T. approval for a £6,000 scheme to install electric lighting in place of gas in parts of Kingsbury.

Company Activities . . .

George Cohen Sons and Co.

The group profit for the year to March 31 last, at £1,764,760 is £61,010 lower than for the previous year. After charging increased taxation the net profit becomes £468,604 (*£714,270*). The final dividend is 8½%, making a total of 12% for the year on the larger capital.

English Electric Co. Ltd.

Last week's offer of £2,500,000 4½% debenture stock 1972-77 was over-subscribed more than twenty times, Lazard Brothers have stated. Applications aggregating over £30 million received from employees of the company and from holders of the debenture, Preference and Ordinary stocks, have had preferential consideration.

Hackbridge and Hewittic Electric Co.

The decline in the demands made upon this company (like others in the heavy electrical equipment industry), which is reflected in a reduction in the order book, is welcomed by Mr. T. F. Lister, the chairman, for the company is able to give better delivery dates in respect of new business both at home and abroad. While those remarks apply particularly to the Transformer and Switchgear divisions, the demand for glass bulb

Year to Mar.31	£ Trading Profit	£ Net Profit	% on Ord.		Ord. Price	
			Earn'd	Paid	High	Low
1949	200,955	74,310	27	12½	12/10	10/3
1950	339,748	136,716	47	15	16/9	11/5
1951	379,331	142,720	51	18	18/7	15/4
1952	464,737	158,546	58	20	17/-	13/3
1953	459,351	154,158	54	20	17/7	16/1

rectifiers shows no falling off, and the order book for these is the largest on the company's industry, he states. But this is not such an embarrassment as a similar position would be in transformers, for the units are smaller and the work on contracts is spread over such long periods. It is expected that output and deliveries for the current year will be maintained and possibly increased. The Canadian subsidiary is doing good business, orders amount to $1,400,000 including contracts from the U.S. Current assets at £2,020,275 exceed current liabilities by £1,310,279.

Murex Ltd.

The final Ordinary dividend is 9% on increased capital. For the year ended April 30 last the group profit amounts to £393,000, compared with £659,000 for the previous year.

Oldham and Son Ltd.

Operations during the year ended March 31 last resulted in a net profit of £262,541, compared with £319,706 for the previous year, before charging taxation of £153,294 (*£187,362*). There is a final dividend of 10%, making a total of 17½% on capital which was increased by 100% scrip issue. For the previous year the distribution was 35% on the smaller capital.

Parmiter, Hope and Sugden

For the year ended March 31 last, the net profit amounts to £37,642—a reduction of £586 on the previous year—after charging taxation of £48,722 (*£52,200*). The final dividend is 18%—an increase of ½%—making the total distribution for the year 25½% (*25%*).

Richardsons Westgarth and Co.

A rise both in profits and the dividend to be paid for the year ended March 31 last is announced in the preliminary statement. After charging depreciation, the gross profit amounts to £811,839—an increase of £85,008 on the previous year—and the net profit is £346,289—as against £247,361—after allocating £465,550 (*£479,470*) for taxation. The dividend is raised by 3% to 15%.

Scottish Cables Ltd.

Apart from the high trading profit, records were achieved in volume of business transacted both at home and overseas, and in production during the year ended April 30 last. Stocks and work in progress at that date amounted to £376,276—about £180,000 lower than for the previous year, due to a prudent decision of the management to reduce stocks of raw materials in view of the price fluctuations. On the future outlook, Mr. William Fraser, chairman, states that although the company started off the year with good order books and the volume of output to date has more or less remained constant, the

Year to Apr.30	£ Trading Profit	£ Net Profit	% on Ord.		Ord. Price	
			Earn'd	Paid	High	Low
1949	254,060	104,822	73	30	25/9	20/4
1950	273,901	115,355	80	30	23/9	21/8
1951	274,561	106,205	75	30	27/6	18/9
1952	311,278	124,900	75	32	11/9	9/-
1953	465,862	176,341	51	20*	12/11	11/1

*Plus 100% capital bonus.

intake of orders has fallen off considerably, due primarily to purchasers' anticipation and reduction in prices when copper is decontrolled next month. The South African associated company is achieving encouraging results, and the directors are studying the possibility of extending their interests elsewhere abroad. It is proposed to alter the financial year to end on March 31, but for the current period, covering eleven months, it is intended to pay a dividend calculated on a full yearly basis.

Dividends Declared

Greengate and Irwell Rubber Co.—Interim Ordinary dividend of 10% (*5%*).

Electric Furnace Co.—Final of 7%, making a total of 12½% (*10%*).

Larmouth and Bulmer.—Final dividend of 10%, making a total of 17½% (*same*).

Commercial Information

CONTRACTS OPEN

HOME

July 24.—Lyme Regis T.C. Supply and erection of concrete columns, wall brackets and necessary fittings for improved street lighting scheme. Borough Surveyor, Borough Offices. Deposit £1 1s. (See July 9 issue.)

July 24.—Monaghan (Eire). Lighting, heating and other services at new post office. J. W. O'Neill, Engineer - in - Chief, Dept. of Posts and Telegraphs, The Castle, Dublin.

July 25.—Alnwick (Northumb.) R.D.C. Installation of electric light at Hillcrest, Shilbottle. O. M. Farrell, Engineer and Surveyor, Old Court Buildings, 34 Green Batt.

July 25.—Peterborough T.C. Lighting and power installations in 128 houses on Dogsthorpe North estate. Applications to F. J. Smith, City Engineer and Surveyor, Town Hall, by above date. Deposit £2 2s. (See July 16 issue.)

July 25.—West Lothian. Electrical work in 211 houses on various sites—largest group being 58 houses at Seafield. Schedules are being prepared and applications to tender should be made by above date to J. Calder, county clerk, County Buildings, Linlithgow.

July 27.—Lancashire. Supply of electric lamps to county council. Applications to County Architect, County Hall, Preston, by above date. (See July 16 issue.)

July 27.—Sale T.C. Electrical installations in 24 bungalows on Baguley Lane estate. Borough Engineer, Town Hall. Deposit £2 2s.

July 27.—Southend-on-Sea. Lighting and power installation at Southchurch Hall school in Ambleside Drive. Borough Architect, 30 Alexandra St. Deposit £2. (See July 16 issue.)

July 27.—Southwick U.D.C. Supply and erection of 27 sodium street lamps, 28 conversions from tungsten and sodium, and 74 tungsten lamps. Engineer and Surveyor, Town Hall. Deposit £2 2s.

July 27.—Stepney B.C. Electrical installation in 19 flats in Vallance Rd. scheme. Borough Engineer and Surveyor, 221-223 Commercial Rd., E.1. Deposit £2 2s.

July 27.—West Riding. Renewal of electrical installation at Darne Thurnscoe The Hill secondary school. County Architect, Bishopgarth, Westfield Rd., Wakefield. Deposit £2 2s.

July 28.—Chadderton U.D.C. Erection of 31 group A street lighting columns in Coalshaw Green Rd. and Drury Lane. Engineer and Surveyor, Town Hall. (See July 16 issue.)

July 28.—Dundalk. Electrical installation at Fever Hospital. J. C. Costelloe, Consulting Engineer, 21 Lesson Park, Dublin. Deposit £10 10s.

July 29.—Billericay U.D.C. Supply of sewage pumping plant comprising three centrifugal pumps driven by electric motors. Engineers, Willcox, Raikes and Marshall, 33 Great Charles St., Birmingham. Deposit £2 2s.

July 29.—Ely (Camb) R.D.C. Electrical equipment for 6 bungalows in The Hithe, 29 houses in Woodfen Drove, and 6 bungalows in Victoria St. (all at Littleport), and 43 dwellings at Sutton and 6 houses at Thetford. Engineer and Surveyor, Council Offices, 11 Lynn Rd.

July 30.—East Riding. Installation of electricity at Leconfield primary school. County Architect, County Hall, Beverley.

July 30.—Stoke-on-Trent T.C. Supply of electric lamps during six months ending March 31, 1954. City Surveyor, Town Hall.

July 31.—Belfast. Supply, erection, etc., of two 48-in. bore motor-operated sluice valves, six motor-operated penstocks and other associated equipment at Belfast Municipal Power Station West. Tender form (No. N.1389) from Merz and McLellan, Carliol House, Newcastle-on-Tyne. Deposit £5 5s. (See July 2 issue.)

July 31.—Dublin T.C. Electrical installation in nurses' home at St. Mary's Chest Hospital. N. Mathews, consulting engineer, 42 Fitzwilliam Place. Deposit £10 10s.

July 31.—Horsham (Sussex) U.D.C. Supply and erection of 34 concrete columns with mercury discharge lanterns, and 39 concrete columns with metal filament lamps on Needles Farm estate. J. P. Ridd, Engineer and Surveyor, Council Offices, Horsham Park.

July 31.—Midlothian. Supply and erection of 77 concrete columns and installation of 80 W mercury lamps, etc., for Group B lighting at Newbattle New Community scheme. County Surveyor, 32 Palmeston Place, Edinburgh.

Aug. 1.—Ross and Cromarty. Installation of electric lighting and power in 22 houses on Isle of Lewis. Applications by above date to P. S. Leake, County Architect, The Old Academy, Dingwall.

Aug. 1.—West Riding. Electrical installation at Aberford secondary school, Parlington Park Camp. County Architect, Bishopgarth, Westfield Rd., Wakefield. Deposit £2 2s.

Aug. 3.—Manchester T.C. Electrical installation at "Lawnhurst" in Wilmslow Rd. City Architect, Town Hall. Deposit £1 1s. (See July 9 issue.)

Aug. 6.—Belfast. Lighting installation in Currie jun. primary school extensions in Cosgrave St. Education Architect's Dept., Academy Street.

Aug. 6.—Belfast T.C. Lighting installation in Currie primary school extensions, Cosgrave St. Education Architect's Dept, Academy Street.

Aug. 7.—Stratford-on-Avon T.C. Supply of electrically-driven pumping plant, with starters, wiring, control and metering equipment, etc., for station at Thelford. Engineers, Willcox, Raikes and Marshall, 33 Great Charles Street, Birmingham. Deposit £2 2s.

Aug. 8.—E. Kesteven R.D.C. Supply, erection, etc., of pumping machinery, each pump complete with electric motor and automatic switchgear. Consulting engineer, Silcock and Simpson, 10 Park Row, Leeds. Deposit £3.

Aug. 8.—Manchester. Electrical installation at Oldwood secondary school, Wythenshawe. City

Architect, Town Hall. Deposit £1 1s.

Aug. 12.—Barrow T.C. Supply and erection of pumping plant, and gear. Borough Engineer and Surveyor, J. N. Flitcroft, Town Hall.

Aug. 15.—Stretford T.C. Supply of 60 steel poles, about 33 ft for street lighting. A. H. Perry, Borough Engineer, Town Hall.

Aug. 19. — Newcastle-on-Tyne. Lighting, power and impulse clock installations at Stocksfield Ave. school. R. W. Gregory and Partners, consulting engineers, Pilgrim House. Deposit £5 5s.

Aug. 20.—Chard T.C. Supply and installation of a street-lighting scheme on county and district roads in the borough. Borough Surveyor, Municipal Offices, Chard, Somerset. Deposit £2 2s. (Advertised in this issue.)

Aug. 20.—Darlington T.C. Provision and erection of electrically driven 500 g.p.m. vertical spindle sludge pump at Stressholme sewage disposal works. Borough Surveyor, Town Hall.

Aug. 24.—Cheltenham T.C. Supply and erection of sodium street lighting equipment in Group A—including lanterns, lighting equipment, steel columns—for Bath-Lincoln trunk road. C. Gould Marsland, Borough Engineer, Municipal Offices. Deposit £3 3s. (See July 16 issue.)

Aug. 24.—Southgate B.C. (a) Supply only of lanterns and control gear for 115 140 W sodium vapour discharge lamps; (b) supply and erection of 115 concrete lamp columns, lanterns, wiring, control gear, etc. Borough Engineer and Surveyor, Town Hall, Palmers Green, N.13. (Advertised in this issue.)

Aug. 24.—Trent River Board. Installation of new lighting equipment at Board's head office, Nottingham, with conversion from d.c. to a.c. Apply by Aug. 5 to Engineer to the Board, 206 Derby Road, Nottingham. Deposit £2. (Advertised in this issue.)

Aug. 26.—Baildon U.D.C. Supply, erection, etc., of 42 250 W MV lanterns on concrete columns in Baildon Rd. and Browgate. Surveyor, Town Hall.

Aug. 28.—Belfast. Supply, erection, etc., of 33/6·6 kV, 10,000 kVA, outdoor step-down transformer, with tap-change equipment. (Tender No. 1299.) Merz and McLellan, consulting engineers, Carliol House, Newcastle-on-Tyne. Deposit £5 5s. (See July 16 issue.)

Aug. 31.—Salford T.C. Electrical installation at Blackfriars public baths. General Superintendent, Admin. Offices, Blackfriars Public Baths. Deposit £1 1s. (Advertised in this issue.)

Aug 31.—Thurrock U.D.C. Manufacture and installation of 3 axial-flow pumps, electrically driven and complete with switchgear, starters, travelling overhead crane, etc., for Marsh Farm Sewage works. W. H. Radford and Son, consulting engineers, Albion Chambers, King St., Nottingham.

No date stated.—Dundee. Renewal of section of electrical installation in engineering dept. of University College. Apply to Mitchell, Day and Leckie, consulting engineers, 34 Castle St., Edinburgh 2.

OVERSEAS

*Details of items marked * may be obtained on application to the Board of Trade, Horseguards Avenue, S.W.1, quoting reference.*

Aug. 10.—Formosa. Central Trust of China has issued call for tenders (Invitation No. 206) for cable and wire, conduit fittings, lamps and other electrical apparatus. Trust is at Taipei, Taiwan. B.o.T. (Ref.: CRE 23078/53)*.

Aug. 11.—U.S.A. Tenders invited for an a.c. water wheel generator, 6,250 kVA, 400 r.p.m., 2,400 V, with spare parts and auxiliary equipment for City of Centralia, Washington. Documents from Carey and Kramer, Consulting Engineers, 1917 First Ave., Seattle. Deposit $25.00.

Aug. 18.—Uruguay. Supply of 220 V armoured cables and cable boxes of various descriptions and quantities under Tender No. 3878/53, Spec. No. 2199, for Usinas Electricas y los Telefonos del Estado. B.o.T. (Ref.: CRE 23764/53).*

Aug. 20.—Uruguay. Tenders invited for supply of 146 automatic circuit-breakers and spares to various specifications by Administracion General de las Usinas Electricas y los Telefonos del Estado. (Tender No. 3880/53. Spec. No. 2201.) B.o.T. (Ref.: CRE 23749/53).*

Sept. 2.—Uruguay. Supply of 500 street lighting suspension units for Usinas Electricas y los Telefonos del Estado. B.o.T. (Ref.: CRE 23630/53).*

Sept. 8.—Australia. Supply of control board for 33 kV switchgear, another for 11 kV switchgear, and a third for mounting busbar protection equipment for ultimate 33 kV switchgear scheme. (Spec. no. 53/9.) Documents from Southern Electric Authority, Boundary St., Brisbane, at £2 2s. per two copies.

Sept. 12.—Tangier. Water and Electricity Board requires supply of electrical equipment for two transformer stations of 5,500 V and one of 22,000 V. Stations are Parc Auto, Nou-

Your Queries — Answered

Motor slide rails, makers of? G.D.—London Shafting and Pulley Co., Ltd., Collingwood Ironworks, Northdown St., Kings Cross, N.1. (23276)

Cone Fittings, Ltd., address of? T.E.—9 Rosemont Rd., London N.W.3. (23284)

Small garden fountains, makers of? E.E.—Stokes Fountains, Ltd., 185-7 London Rd., Croydon, Surrey; Broadwall Engineering Co., Ltd., Kent House Lane, Beckenham, Kent. (23291)

Fireproof and electrically insulating liquid floor covering material for a concrete floor, makers of? D.C.—Try: Surfex Flooring Co., Station Yard, Camberley, Surrey; Marbolith Flooring Co., Ltd., 29 Albert Embankment, S.E.11. (23302)

"Beco" generators, makers of? L.B.—British Electric Co. (Beco Ltd.), Lower Rd., Rotherhithe, S.E.16. This concern went out of business in 1951. (23316)

"Helvetia" catering machinery, etc., makers of? T.E.—Leechti and Co., Langnau I.E., Switzerland. (23326)

The above are selected from questions we have answered this week. If you have a query, send it to us.

ANSWER WANTED

"Essex" bulkhead fittings, makers of? S.E. (23341)

Contracts Open—Overseas—cont.

velle Administration, and Anfa. B.o.T. (Ref: CRE 23140/53*).

Oct. 1.—S. Rhodesia. Supply, erection of 33 kV and lower voltage transformers and accessories for Salisbury power station 3. Merz and McLellan, Carliol House, Newcastle-on-Tyne.

Oct. 27.—New Zealand. State H.-E. Dept. require supply of two 11 kV current limiting reactors for Kaweran substation. They should be 3-phase, each 5,000 kVA, outdoor type, oil immersed and self cooled, and will be connected between incoming switches of 150 MVA switchboard and busbars of 350 MVA switches. Busbars to be connected to 20 MVA 110/11 kV transformer bank. Deposit £100 with similar amount for bond. Contract No. 237. Documents at N.Z. High Commissioner's Office, Adelphi Building, John Adam St., W.C.2.

Nov. 2.—Nigeria. Supply of materials and erection of about 85 miles of single-circuit o.h. lines to operate at 135 kV between Lagos and Ibadan, and about 55 miles to operate at 33 kV from Abeskuta to Sjebnode. Documents from Crown Agents for Colonies, 4 Millbank, London, S.W.1. Ref.: EM 725/4/2. Fee £10 for set of 3 copies. (See July 16 issue.)

CONTRACTS PLACED

Kensington B.C. Supply and installation of equipment for lighting 104 pedestrian crossings Gowshall Ltd., £1,929.

Manchester T.C. Electrical work at Margaret Barclay Residential Special School, Brown and Co. (Electrical Engineers), Ltd.; at Charlton grammar school, C. R. Whately; at Openshaw College for Further Education, Electrical Equipment Co. (Leicester), Ltd.

Newcastle-on-Tyne T.C. Electrical installation in Jesmond Dene House boarding school, Dougal and Railton, £2,921; same in Rutherford College of Technology (phase 2), Robson and Coleman Ltd., £19,427.

Torquay T.C. Electrical work in 149 houses on Sherwell Valley estate, C. M. F. Allwood, £3,520.

West Hartlepool T.C. Electrical equipment for proposed £11,000 crematorium in town. E. Dixon Barker and Co. Ltd.

PRICE OF CABLE METALS AND OTHER MATERIALS
(at Tuesday night)

	£ s. d.	New York price
COPPER, electrolytic	252 0 0	—
LEAD, good soft pig (foreign)... ...	94½-94½	107 0 0
TIN (99·99·76%) ... ...(Cash)	571-572	—
,, (3 months)	571½-572½	—
ALUMINIUM, commercial purity (del.)	150 0 0	—
ZINC	74-74½	88 0 0
ARMOURING:		
Galv. Steel Wire (0·104 in.) ...	50 10 0	—
Mild Steel Tape (0·04 in.) ...	40 0 0	—

GAZETTE ANNOUNCEMENTS

COMPANIES ACTS

Voluntary Liquidation

County Electronics Ltd. Resolution for voluntary winding-up passed at meeting on July 10. Mr. A. T. Eaves, C.A., 47 Mosley St., Manchester 2, appointed liquidator, to whom creditors should send particulars by September 1.

George Dann Ltd., heating and electrical engineers, of Hailsham, Sussex. Liabilities amounting to £2,335, of which £645 was due to trade and expense creditors, and £1,689 in respect of bank overdraft, secured by personal guarantee of a director, were shown in statement of affairs submitted to statutory meeting of creditors. Assets were estimated at £1,201, and after allowing £7 for preferential claims, there were net assets of £1,193, or deficiency of £1,141. Note on statement explained that there was a debt due amounting to £361 which had not been included in assets. Court ordered further particulars of debt before giving judgment. It was believed that substantial amount could be recovered as soon as particulars were given. Resolution passed confirming voluntary liquidation with Mr. J. S. Bradley-Hole, of A. E. Orbell and Co., 7 Old Steine, Brighton, as liquidator.

Silver-tone Lighting and Radio Ltd., lighting equipment and electrical retailers, etc., of Ipswich. At statutory meeting of creditors statement of affairs was circulated showing liabilities of £1,693, of which £887 was due to trade creditors; £101 to creditors; and £704 on directors loan account. Assets were scheduled at £9. At shareholders meeting resolution was passed for voluntary liquidation with Mr. Bertram Silverstone, 3a Amhurst Parade, N.16, as liquidator. No resolution was passed by creditors and matter therefore remains in liquidator's hands.

BANKRUPTCY ACTS

Receiving Order

Exeter. Robert J. Camden, electrical engineer trading at 32 New Bridge St., Exeter. Date of receiving order, July 10.

Sussex. Luker, James William, and Phillips, Henry Arthur Richard, laterly trading as Gordon and Luker, electrical contractors, at East St., Lewes.

Public Examinations

Grimsby. A. Altman, electrical dealer, of 230-2 Freeman St., Grimsby. Public exam. will be held at Town Hall, Grimsby, on Sept. 3 at 11 a.m. First meeting was on July 21.

King's Lynn. Roy B. Goetze, electrical contractor, trading at Old Market, Wisbech. Public exam. will take place at Court House, London Rd., King's Lynn, on Sept. 10, at 11.30 a.m. First meeting was held yesterday (Wed.).

Appointment of Trustee

Barnstaple. Snow, Arthur Cecil, mechanical and electrical engineer, 47 High St., Barnstaple. Trustee E. A. Savage, Abbey Gate House, College Green, Bristol. Date of appointment, July 13.

Intended Dividend

Barrow-in-Furness and Ulverston. Browne, Robert Edwin, electrical contractor, trading as Browne Brothers, 121 Market St., Dalton-in-Furness. Trustee, D. Atkinson, 14 Lowther St., Carlisle. Last day for receiving proofs, August 1.

Dividend

Brighton. Alice E. Dalmon and Stanley J. Dalmon, trading as P. Dalmon and Sons, electrical engineers, at 60 Teville Rd., Worthing. First and final dividends of 7s. 5d. in £ payable tomorrow (Fri.) at offices of A. E. Orbell and Co., 7 Old Steine, Brighton.

BUSINESS PROSPECTS

HOME

Antrim. N. Antrim Hospital Management Committee is seeking approval for £33,661 improvements at Route Hospital, Ballymoney.

Aycliffe (Dur.) T.C. Erection of 297 dwellings for Development Corpn. A. W. Thomas, general manager, Newton Aycliffe.

Basingstoke T.C. Erection of nine shops and maisonettes. Borough Architect, E. Almond, Municipal Buildings.

Birmingham. Hercules Cycle Motor Co. propose to carry out £36,000 extensions at their Salford St. premises.

Bishop Auckland U.D.C. Permission being sought to build 52 houses on Woodhouse Close estate.

Bootle T.C. Construction of block of 8 shops with maisonnettes on Sterrix Lane site. Borough Surveyor, Town Hall.

Bridgnorth (Salop) T.C. construction of 65 houses on Grove estate. Borough Surveyor, College House.

Bristol. Approval granted for work on six primary and secondary schools at Withywood Henbury, Hartcliffe, Lawrence Weston, Monks Park and Bedminster Down. Estimated total cost £640,339.

Brownhills (Staffs.). Architect for factory in Lichfield Rd. for Perfichrome Ltd. is H. Holland, 38 Edward St., West Bromwich.

Clyde. Large oil depot is to be constructed at Garelock. Scheme is expected to cost about £3 million.

Cork (Eire) T.C. Erection of 174 dwellings at Killeenreendowney. P. Monahan, city manager and town clerk, City Hall.

Doncaster T.C. Layout plans approved for completion of Intake housing estate.

Donegal. Site at Falcarragh has been acquired by Donegal Industries Ltd. for erection of glove factory.

Dunstable. T. Mitchell of 20 Bedford Sq., W.C.1, is architect for factory proposed by Commer Cars Ltd.

Durham T.C. Construction of six shops and flats on Sunderland Rd. estate. City Engineer, Town Hall.

E. Kilbride. Scottish Industrial Estates Ltd., 3 Woodside Place, Glasgow, have been authorised to build factory for Glasgow engineering firm of Hayward Tyler and Co. Ltd.

Edmonton (Middx.) T.C. Recommended to approve laying of cables and wiring alterations of 551 houses and eight flats on Hyde estate. Estimated cost £6,428.

Folkestone T.C. Plans in hand for erection of (a) 27 flats in North Street; and (b) about 166 dwellings in Hill Road.

Hatfield R.D.C. Erection of 121 houses and 7 bungalows in Roe Hill. Council's Architect, J. H. Parker, 82 Great North Rd.

Holborn B.C. Scheme for lighting pedestrian crossings at cost of £8,250 is to come before Council for approval.

Huntingdonshire. First instalment of Huntingdon secondary school is to be included in next year's building programme. Estimated cost £120,000.

Ilford. Printing works is planned by S. Essex Recorders Ltd. Plans by W. D. Key, 3 Tindal Sq., Chelmsford.

Jarrow-on-Tyne T.C. Sixty maisonettes and 16 shops are being planned for erection in Ormonde Street.

Kingston-on-Thames. A. Redhouse, 176 Elmbridge Ave., Surbiton, is architect for erection of £10,000 synagogue and communal hall in Uxbridge Rd.

Lewisham B.C. It is proposed to erect ten houses in Somertrees Ave.; 163 flats, 16 houses and 10 shops on Ladywell Park site; and 21 flats and ten maisonnettes in Hither Green Lane and Campshill Place.

Manchester. Aldhouse Milnes Ltd., are planning to double their existing factory premises on the Wythenshawe estate.

Middlesbrough T.C. It is suggested that 11 shops and houses be built in Westerdale Rd. Cost estimated at £46,000.

Middlesbrough T.C. Approval given to extension of Carter Bequest Hospital, and also for erection of 372 houses on Park End site.

North Riding. Construction of new infants' school at Marske. Architect is J. H. Napper, 56 Eldon Place, Newcastle-on-Tyne.

Peterhead T.C. Dean of Guild Court has approved erection of 80 houses on Catto Drive and Blackhouse schemes.

Prudhoe (Northumb.) U.D.C. Shopping centre is proposed on Oaklands estate.

Rutherglen. A. G. McFadden and Co., steel merchants, are planning modernisation and additions to Caledonian works at cost of about £30,000. The same company has also received Dean of Guild Court's approval for similar work at Farmeloan Rd. works.

Sheffield. H. Barringham Ltd., are planning to build factory and warehouses in site in Scotland Street.

Southend-on-Sea T.C. Erection of 44 houses, 24 flats and 16 maisonnettes on site 17. Borough Architect, 30 Alexandra Street.

Southgate (Middx.). It is proposed to build Winchmore secondary school, costing about £195,600, on site off Highfield Rd.

Southport T.C. Tenders may soon be invited for re-wiring at St. Teresa's R.C. school and for provision of additional lighting points.

Southwark. Plans in hand for new factory in Tabard St. for S. Surridge and Co. Ltd., 210 Borough High St., S.E.1.

Staffs. Adaptation of Rangemore Hall, nr. Burton-on-Trent as school for deaf children has been suggested. Estimated cost £125,000.

Stoke-on-Trent. Approval received for extensions costing £220,000 at N. Staffordshire Technical College.

Swansea. Plans submitted for R.C. secondary school at Derwen Fawr.

Swindon. Architects for new building on industrial estate for T. Wall and Sons, Ltd., are R. J. Beswick and Son, 10 Victoria Rd., Swindon.

Tamworth (Staffs) T.C. Tenders to be invited shortly for shops, flats and maisonnettes on Gilway estate.

West Bromwich. Factory extensions and some offices are proposed by Birco Motor Cylinder Co. in Union Road.

OVERSEAS

Canada. Canadian Tire Corpn., Ltd., of 837 Yonge St., Toronto, wish to contact U.K. manufacturers able to supply cylindrical type vacuum cleaners. Interested persons should write to Mr. J. W. Billes, president, direct.

NEW COMPANIES

Extracted from the Register issued by Jordan and Sons, Ltd., 116 Chancery Lane, London W.C.2.

Brown Fintube Co. (Great Britain), Ltd. Manufacturers of and dealers in heating, refrigerating, ventilating, lighting and control plant, etc. Cap.: £10,000. Dirs.: to be appointed by subscribers. Subs.: H. A. Tippetts, Berry Hall, Solihull, and S. A. Tippetts, The Old Rectory, Upper Swell, Stow-on-the-Wold, Glos.

Johnson's of Allerton Road (Electrical) Ltd., 81 High St., Runcorn, Ches. Television and radio engineers, electricians, etc. Cap.: £500. Dirs.: I. C. Jones, R. T. Jones, D. J. Crowe, F. C. Jones and H. Woodland.

MEETINGS TO NOTE

FRIDAY, SEPT. 4

SOUTHAMPTON ELECTRIC CLUB. Inaugural meeting at Polygon Hotel, 7 p.m.

TUESDAY, SEPT. 15

A.P.L.E. Annual Conference and Exhibition at Liverpool continues until Sept. 18.

THURSDAY, SEPT. 24

I.E.E. Section summer visit to Porthcawl, Sept. 24 to 27.

EXHIBITION DIARY

Royal Welsh Agric. Show will be held at Cardiff between July 22 and 25.

Radio and Television. 20th show at Earls Court opens on Sept. 1 and closes on Sept. 12.

Engineering, Marine and Welding. 19th Show opens at Olympia on Sept. 3 and continues until Sept. 17.

Electro Medical. This exhibition and the first International Congress of Physical Therapy opens at Central Hall, Westminster, on Sept. 7. It closes on Sept. 11.

TRADE NOTES

Exports and Distributors. Porter Electrical Products, Ltd., have appointed Lloyds (M/c) Electrical Industries, Ltd., 20 Princess Street, Manchester 1, as sole exporters for the "Portaway" earth-continuity system. Newey & Eyre, Ltd., Birmingham, have been appointed distributors for Warwickshire, Shropshire, Derbyshire, Worcs. and South Staffs.

Malaya Imports. The Federation of Malaya has lifted quota restrictions on the import from European countries of electric refrigerators.

Scottish Depot. Martindale Electric Co., Ltd., have opened premises at 25 Elmbank Street, Glasgow, C.2. Telephone Central 0049.

Trade Counter. Thorn Electrical Industries, Ltd., have opened a trade counter at 39/45 St. Pancras Way, N.W.1.

Beama Contract Price Adjustment Formulae.—*For Electrical Machinery and Equipment.* For purposes of calculating variations in: (*a*) "Rates of Pay"—the rate of pay of adult male labour at July 18, 1953, shall be deemed to be 141s. 6d. (*b*) "Cost of Material"—the index figure for Materials used in the Electrical Machinery Industry, published in the Board of Trade Journal on July 18, 1953, is 150·8.

For Turbo-Generating and Allied Plant. For purposes of calculating variation in: (*a*) "Rates of Pay"—the rate of pay for adult male labour at July 18, 1953, shall be deemed to be 141s. 6d. (*b*) "Cost of Material —the index figures published in the Board of Trade Journal on July 18, 1953, are: Materials used in Mechanical Engineering Industries—143·1. "Blast Furnaces and Iron and Steel Melting and Rolling (40 and 41)"—144·5. The price of brass condenser tubes ¾in. o/d. 18 SWG published in The Metal Bulletin on July 17, 1953, is 3s. 8¼d. per lb.

For Outstanding Contracts covered by the B.o.T. Intermediate products Index. For purposes of calculating variations in (*a*) "Rates of Pay"—the rate of pay for adult male labour at July 18, 1953, shall be deemed to be 141s. 6d. (*b*) "Cost of Material"—the index figure for Intermediate Products published in the Board of Trade Journal on July 18, 1953, is 355·4.

Change of Address. As from August 1, the address of the Exeter branch of British Insulated Callender's Cables, Ltd., will be 40 Whipton Village Road, Whipton, Exeter. Telephone Exeter 67308.

Change of Name. Structural and Mechanical Development Engineers, Ltd., 2 Buckingham Avenue, Slough, Bucks, announce that the company name has been changed to S.M.D. Engineers, Ltd. This concern is the construction company of the Almin group (parent company, Almin, Ltd.).

E.W.F. Messrs. M. & E. Services (Wholesale), Ltd., 1a Tenters Square, Wrexham, and Sutton Wholesale Elec. Co., Ltd., George Street, Sutton, Surrey, have been elected members of the Electrical Wholesalers' Federation.

TELEPHONE MANUFACTURING CO.

THE 23rd annual general meeting of Telephone Manufacturing Company Limited was held on July 20 in London, Mr. Fred T. Jackson, O.B.E., Comp.I.E.E. (Chairman and Managing Director) presiding.

The following are extracts from his circulated statement:—

Turnover for 1952 reached a high level, although the proportion represented by direct exports dropped to 26% from 31% for 1951.

We are maintaining our efforts in the Export Markets and we hope it will not be long now before the Australian Post Office will be free to place orders in this country again.

Our Canadian Branch is making progress and has been invited by the Canadian Department of Defence Production to tender on two projects.

Some of the results of our development work are now in the early stages of exploitation and we have great hopes, in particular, of our new Line Transmission Equipment, which is manufactured at our St. Mary Cray factory.

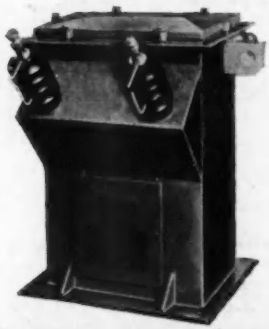
The continued restrictions imposed by the Treasury on the expansion of the Telephone Service in this country is causing us increasing concern.

As to prospects for the current year, output should be maintained at its present high level for the greater part of the year, but I should like to see more orders for delivery during the last three months. I do not anticipate much improvement in the market for the electric wiring accessories handled by T.M.C.-Harwell (Sales).

The report was adopted and the dividend of 10% was approved.

HACKBRIDGE
TRANSFORMERS

One of two 3-phase 132/66/11kV. Hackbridge Transformers at a substation in Australia



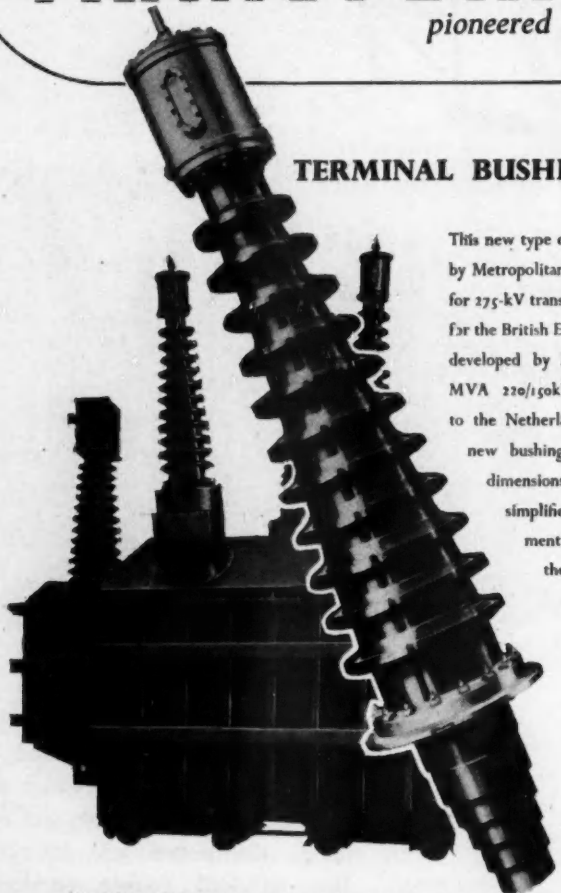
HACKBRIDGE Transformers are backed by long and varied experience in the design and manufacture of transformers of every type, size and voltage — for supply, distribution and industrial applications. Also on-load voltage regulating equipment, reactors, arc-suppression coils and high-grade instrument transformers.

HACKBRIDGE AND HEWITTIC ELECTRIC CO., LIMITED
WALTON-ON-THAMES - SURREY - ENGLAND
Telephone: Walton-on-Thames 760 (8 lines) Telegrams: "Electric, Walton-on-Thames"

Technical progress in

TRANSFORMERS

pioneered by Metrovick



TERMINAL BUSHING FOR 275kV

This new type of terminal bushing, as used first by Metropolitan-Vickers, has been standardised for 275-kV transformers now under construction for the British Electricity Authority. Originally developed by Metrovick for use with a 100 MVA 220/150kV three-phase group supplied to the Netherlands Government in 1949, the new bushing considerably reduces overall dimensions, improves reliability and simplifies construction. This development provides a typical example of the advance in progress throughout the electrical industry made possible by Metrovick research and practical experience.

METROPOLITAN-VICKERS ELECTRICAL COMPANY LIMITED · TRAFFORD PARK · MANCHESTER 17.
Member of the A.E.I. group of companies

METROVICK *Transformer Design Leads the Way*

E/A202

CLASSIFIED ADVERTISEMENTS

OFFICIAL TENDERS AND APPOINTMENTS

WORK WANTED WANTED · FOR SALE

Those wishing to advertise in these pages should send the text to the Classified Advertisement Dept., Electrical Times, Sardinia House, Sardinia Street, London W.C.2, before 10 a.m. on TUESDAY of week of issue. Official Displayed Advertisements are charged at 42s. per inch, and all other classified advertisements at 3s. per line. Situations Wanted will be published four times for twice the single insertion rate. Fee for Box No. and postage on replies is 2s.

TENDERS INVITED

BOROUGH OF SOUTHGATE

IMPROVEMENT OF STREET LIGHTING
North Circular Road

TENDERS are invited for the following contracts in connection with the improvement of street lighting to Group "A" standard on that part of the North Circular Road which is in the Borough.

Contract A. Supply only of lantern and control gear for 115 No. 140 watt Sodium Vapour Discherge Lamps.

Contract B. Supply and erection of 115 No. Concrete Lamp Columns and fixing lanterns, control gear, wiring, etc.

Separate contract documents will be issued and contractors may tender for one or both contracts.

Contractors wishing to tender should apply to the Borough Engineer and Surveyor for a copy of the relevant documents.

Sealed tenders, in the envelopes provided, must be received by the undersigned not later than 9 a.m. on Monday, August 24, 1953.

The Council do not bind themselves to accept the lowest or any tender and the acceptance of any tender will be subject to the approval of the Ministry of Transport.

GORDON H. TAYLOR,
Town Clerk.

Town Hall,
Palmers Green, N.13.
July 14, 1953. (E 452)

TRENT RIVER BOARD

OFFICE LIGHTING SCHEME

TENDERS are invited for the installation of new lighting equipment at the Board's Head Office, 206 Derby Road, Nottingham, together with alterations necessitated by the conversion from d.c. to a.c.

Copies of the specification, conditions, etc., may be obtained from the Engineer to the Board, 206 Derby Road, Nottingham, on payment of a deposit of £2 (cheques to be made payable to the Trent River Board) which will be refunded only on receipt of a bona-fide tender, which is not subsequently withdrawn, and the return of all drawings and documents.

Applications for documents, etc., must be received by the Engineer by August 5, 1953.

Tenders must be enclosed in the envelope supplied by the Board and delivered to the undersigned not later than noon on Monday, August 24, 1953.

JOHN HIRST,
Clerk of the Board.
(E 465)

CITY OF SALFORD

BATHS AND WASH-HOUSES DEPARTMENT

TENDERS are invited by noon Monday, August 31, 1953, for the ELECTRICAL INSTALLATION required at Blackfriars Public Baths.

Specifications, conditions, drawings and form of tender may be obtained from the General Superintendent, Administrative Offices, Blackfriars Public Baths, Salford 3, on payment of a deposit of £1 1s. which will be returned on submission of a bona-fide tender not subsequently withdrawn.

Tenders to be returned in plain, sealed envelopes endorsed "Blackfriars Baths—Electrical Installation" and forwarded to the undersigned.

H. H. TOMSON,
Town Clerk.

Town Hall, Salford 3. (E 449)

BOROUGH OF CHARD

STREET LIGHTING

TENDERS are invited for the supply and installation of a STREET LIGHTING SCHEME on county and district roads in the Borough of Chard.

Contract documents may be obtained from the Borough Surveyor, Municipal Offices, Chard, Somerset, on payment of £2 2s., which will be refunded on receipt of a bona-fide tender.

Tenders, in plain sealed envelopes marked "Street Lighting" should be delivered to the undersigned not later than 10 a.m. on Thursday, August 20, 1953.

The Council do not bind themselves to accept the lowest or any tender.

F. W. SEARLE,
Town Clerk.

Municipal Offices,
High Street, Chard.
Somerset.
July 17, 1953. (E 451)

APPOINTMENTS VACANT

Engagement of persons must be made through a Local Labour Office or Scheduled Employment Agency, if the applicant is a man aged 18-64, or a woman aged 18-59; unless the person concerned is excepted or the employment is in a managerial or professional capacity, or is otherwise excepted from the provisions of the Notification of Vacancies Order, 1952.

BRITISH ELECTRICITY AUTHORITY

North Western Division

VACANCY No. 161/53. SHIFT CHARGE ENGINEER at Bury Generating Station. Salary £849 to £881 (E.7).

Vacancy No. 162/53. SHIFT CHARGE ENGINEER, Agecroft (H.P.) Generating Station, near Manchester. Salary £729 to £758 (G.7).

Vacancy No. 163/53. SHIFT CHARGE ENGINEER, Westwood Generating Station, Wigan. £729 to £758 (G.7).

Vacancy No. 164/53. STATION SHIFT CONTROL ENGINEER, Huncoat Generating Station, near Accrington. Salary £577 to £596 (F.10).

Vacancy No. 165/53. DEPUTY STATION SUPERINTENDENT, Carlisle Generating Station. Salary £912 to £981 (F.3). Corporate membership of appropriate professional institution and wide experience of operation, maintenance and administration of modern power station required.

Apply, quoting Vacancy No. to Establishments Officer, British Electricity House, 825 Wilmslow Road, Manchester 20, before July 31. (E 425)

BRITISH ELECTRICITY AUTHORITY

Eastern Division

APPLICATIONS are invited for the following post:—

STATION SHIFT CONTROL ENGINEER
Watford Generating Station.

Salary Class "E," Grade 10, £555 to £569 per annum, plus London Weighting.

Applicants should have reached the standard of Ordinary National Certificate in electrical engineering or its equivalent, have had experience in the operation of a switchboard at a generating station and be fully conversant with high voltage switching operations and protective systems.

Applications stating age, qualifications and experience should be sent to the Divisional Controller, British Electricity Authority, Eastern Division, Northmet House, Southgate, N.14, by August 6, 1953. (E 442)

BRITISH ELECTRICITY AUTHORITY

East Midlands Division

APPLICATIONS are invited for the following positions within the Division:—

CIVIL ENGINEERING DRAUGHTSMEN
Construction Department
Vacancy No. 22/53

Candidates should have experience in design and detail of reinforced concrete structures, piled and slab foundations for heavy plant, culverts, cable subways, etc., for general building construction, drainage and sanitation schemes, associated with office and administrative buildings.

The salary will be in accordance with Grade 5 (£567 to £671 per annum) or Grade 6 (£433 to £567 per annum) of Schedule "D" of the National Joint Board Agreement.

ENGINEERING DRAUGHTSMEN (MECHANICAL)
Construction Department
Vacancy No. 44/53

Senior Draughtsmen are required in the mechanical section of the construction department at North Wilford Power Station. Candidates should have experience in one or more of the following:—

(i) Design and layout of power station equipment, including turbo-alternators, boiler plant, coal and ash plant, and general station auxiliaries.
(ii) H.P. and L.P. steam and feed pipework. Condensing plant and feed heating systems.
(iii) Conveyor plant, coal handling systems and material handling of station auxiliary equipment.

Salary and conditions of service will be in accordance with the National Joint Board Agreement, Grade 5 (£567 to £671 per annum), and Grade 6 (£433 to £567 per annum) of Schedule "D" according to experience.

ENGINEERING DRAUGHTSMEN (ELECTRICAL)
Construction Department
Vacancy No. 61/53

Candidates should have experience in the preparation of layouts and diagrams for the installation of E.H.T. and L.T. switchgear, transformers, E.H.T. and L.T. cables; knowledge of protective gear systems would be an advantage.

The salary will be in accordance with Grade 5 (£567 to £671 per annum), or Grade 6 (£433 to £567 per annum) of Schedule "D" of the National Joint Board Agreement.

JUNIOR ENGINEER
Coventry Power Station
Vacancy No. 73/53

Applicants should have had technical training and preferably experience in a power station.

Salary and conditions will be in accordance with Class "G," Grade 14, £491 per annum.

Closing date for this appointment will be July 29, 1953.

SECOND ASSISTANT ENGINEER (CIVIL)
Divisional Headquarters. Vacancy No. 74/53

THIRD ASSISTANT ENGINEER (CIVIL)
North Wilford Extensions. Vacancy No. 75/53

Applicants should hold a degree in civil engineering, be Corporate Members of the Institution of Civil Engineers or possess equivalent qualifications.

They should have had experience in the design and construction of heavy foundations, river works, structures in reinforced concrete and steel and other civil engineering works associated with the design and construction of power stations.

Experience in the preparation of specifications, bills of quantities and estimates will be an advantage.

The salary for Second Assistant Engineer will be within Schedule "C," Class "AX/DX," Grade 2 (£834 to £1,053 per annum) of the National Joint Board Agreement.

The commencing salary for Third Assistant Engineer will be £649 to £705 per annum within Schedule "C," Class "AX/DX," Grade 5 (£649 to £858 per annum) of the National Joint Board Agreement.

The closing date for these appointments will be August 6, 1953.

THIRD ASSISTANT ENGINEER (MECHANICAL)
Generation Construction Department' Castle Donington Site. Vacancy No. 77/53

Applicants should have had a fundamental training in mechanical engineering, including workshops, and should preferably have had experience in the manufacture, erection, maintenance and operation of mechanical plant as installed in modern power stations. Candidates should possess a university degree or equivalent qualification in mechanical engineering.

Salary for this appointment will be within Class "AX/DX," Grade 5, Schedule "C" (£649 to £858 per annum) of the National Joint Board Agreement.

Closing date for this appointment will be August 6, 1953.

TEMPORARY CLERK OF WORKS
North Wilford Extensions
Vacancy No. 76/53

Applications are invited from suitably qualified persons for appointment as a temporary Clerk of Works at a wage of £11 per week in connection with extensions to the North Wilford Power Station. The appointment will be for a period of 18 months to two years.

(*Continued in next column*)

(*Continued from previous column*)

Candidates must have a sound knowledge of reinforced concrete construction and civil engineering works, and preference will be given to those with previous public works experience.

Closing date for this appointment will be August 7, 1953.

The above appointments will be superannuable within the provisions of the British Electricity Authority and Area Boards Superannuation Scheme, with the exception of Vacancy No. 76/53.

Applications should be submitted on the official form which may be obtained from the Divisional Establishments Officer, British Electricity Authority, Barker Gate, Nottingham, and should be returned to the Divisional Controller. Please quote Vacancy Number.

L. F. JEFFREY,
Divisional Controller.
(E 460)

YORKSHIRE ELECTRICITY BOARD

APPLICATIONS are invited for the following appointments:—

No. 1 (Bradford) Sub-Area

SECOND ASSISTANT ENGINEER
(Estimating, Installation and Appliance Maintenance)

The successful applicant will be responsible for the organisation of the Sub-Area Installation and Appliance Maintenance Sections. Applicants should have a wide experience in the electricity supply industry in connection with the supervision of schemes for all classes of domestic, commercial and industrial installations, including specifications, estimates and tenders, together with a sound practical experience in the organisation and administration of large workshops dealing with repairs to all types of domestic, commercial and industrial equipment.

Salary: N.J.B., Class "K," Grade 7, £869 to £907 p.a.

Keighley District

DISTRICT COMMERCIAL ENGINEER

Applicants should have considerable experience in the commercial and engineering aspects of a district organisation, including negotiations with all classes of consumers. They must be capable of preparing estimates, tenders and specifications, and supervising complete domestic, commercial and industrial installations of all types. The possession of a Higher National Certificate in electrical engineering, or its equivalent will be an advantage.

Salary: N.J.B., Class "E," Grade 4, £803 to £834 p.a.

Applications, giving full details of age, qualifications and experience, should be forwarded to the Manager No. 1 (Bradford) Sub-Area, Yorkshire Electricity Board, 45-53 Sunbridge Road, Bradford, not later than August 6, 1953.
(E 447)

BRITISH ELECTRICITY AUTHORITY

Southern Division

S/13.420 S/13.421

APPLICATIONS are invited for the following vacancies in the Transmission Department at Portsmouth:

GENERAL ASSISTANT ENGINEER (ELECT.)

Applicants should be experienced in Switchgear and Transformer Contract work and erection on site. Preference will be given to those who have had a Works or Drawing Office apprenticeship.

GENERAL ASSISTANT ENGINEER
(Clerk of Works)

Applicants should be experienced in the supervision of civil contracts including piling, reinforced concrete structures, and industrial buildings, also in the use of levelling instruments, and the recording of measurements.

For either position applicants should be graduate members of the appropriate engineering Institution or hold equivalent qualifications.

Salary N.J.B. "AX/CX," 8, £501 to £675.

Special application forms, obtainable from P. D. A. Oliver, Esq., Divisional Secretary, 111 High Street, Portsmouth, should be returned by August 5, 1953.
(E 463)

BRITISH ELECTRICITY AUTHORITY

Midlands Division

JUNIOR ENGINEER required in the Generation Engineer's (Operation) Department at Wolverhampton. N.J.B. service conditions, superannuable appointment, salary within Schedule "C," Grade 9, commencing in range £390 to £525, and ultimately rising to £572.

Applicants should preferably possess the Higher National Certificate in electrical or mechanical engineering and duties will consist of statistical work and investigations relating to the operation of a group of generating stations.

Apply on forms available from the Establishments Officer, 53 Wake Green Road, Moseley, Birmingham 13, or on Form AE6, by August 8, 1953. (E 454)

SOUTHERN ELECTRICITY BOARD

DISTRICT MANAGERS

APPLICATIONS are invited for the following posts:—
MANAGER OF THE STAINES DISTRICT
in No. 1 (Southall) Sub-Area.
MANAGER OF THE ISLE OF WIGHT DISTRICT
in No. 3 (Portsmouth) Sub-Area.

The provisional salary for each of these appointments will be £1,325 per annum, and the ultimate salaries and conditions of service will be in accordance with such terms as may be laid down from time to time by the appropriate negotiating body.

Candidates for these posts should be Chartered Electrical Engineers, and possess a competent knowledge of Commercial practice. They should have experience in the management of an Electricity Supply Undertaking.

The successful candidate will, if eligible, be required to contribute to the B.E.A. and Area Boards Superannuation Scheme.

Applicants who wish to be considered for both vacancies need only submit one application form. Applicants who wish to apply for one vacancy only should indicate on the application form for which post they wish to be considered.

Applicants who have recently completed a form of application for the posts of Manager in the Uxbridge or Lyndhurst Districts of the Board may apply by letter referring to their previous application. All other persons should submit applications on forms obtainable from the Secretary, Southern Electricity House, Littlewick Green, Maidenhead, Berks, which should be returned to him not later than August 14, 1953.

(E 453)

CITY OF BELFAST

Electricity Department

APPLICATIONS are invited for the position of:—
JUNIOR ASSISTANT (SHIFT) ENGINEER

Applicants must have a university degree in engineering or the Higher National Certificate in Electrical Engineering, or be Corporate Members of the Institution of Electrical Engineers. They must have a sound engineering training. They must not be more than 45 years of age on the date of taking up the appointment.

The weekly wages for the position are equivalent to Grade II, Class "H," of the Northern Ireland Joint Board Schedule of Salaries for Technical Engineers on the Staff of Authorised Undertakers. The scale is £607 per annum for the first two years, £617 for the third and fourth years, and £626 after the fourth year. Upon the completion of 12 months' satisfactory service the position will be established on the salary list, and shall be terminable during the first 12 months by one week's notice and thereafter by one calendar month's notice on either side. Superannuation contributions will be payable at the rate of approximately 6% on remuneration.

Applications, which must be made on the official forms obtainable from the Electricity Department, East Bridge Street, Belfast, must reach the undersigned not later than 4 p.m. on Friday, August 14, 1953.

Canvassing in any form, oral or written, direct or indirect, will, if proved to the satisfaction of the appointing authority, disqualify a candidate for appointment.

JOHN DUNLOP,
Town Clerk.

City Hall, Belfast.
July 16, 1953. (E 455)

NORTH EASTERN ELECTRICITY BOARD

APPLICATIONS are invited for the appointment of GENERAL ASSISTANT ENGINEER, Chief Engineer's Department, Communications Sub-section, at Area Board Headquarters, Carliol House, Newcastle-upon-Tyne, 1.

Applicants should have qualifications entitling to Graduate Membership of the I.E.E. Experience of magneto and automatic telephone systems and also equipment used on supervisory installations essential. Knowledge of V.H.F. radio an advantage.

Salary, Schedule "C," Grade 8. £501 to £694, N.J.B. conditions of service.

Applications, stating age, qualifications and experience should be forwarded to the Secretary (Establishments), Carliol House, Newcastle-upon-Tyne, 1, within 10 days of the appearance of this advertisement. (E 456)

BRITISH ELECTRICITY AUTHORITY

Midlands Division

SHIFT CHARGE ENGINEER required at Ocker Hill Generating Station. N.J.B. service conditions, superannuable appointment, salary within Schedule "A," Grade F7, commencing at £697 per annum.

Higher National Certificate in electrical and mechanical engineering required, and sound technical training and practical experience in the control and operation of steam generating plant and main switchgear.

Apply on forms available from Establishments Officer, 53 Wake Green Road, Moseley, Birmingham 13, or on Form AE6 by August 8, 1953. (E 444)

MIDLANDS ELECTRICITY BOARD

APPLICATIONS are invited for the following superannuable posts:—

DISTRIBUTION SHIFT CONTROL ENGINEER
North Staffs. Sub-Area.

The appointment is for duties at the Stoke-on-Trent Common Service Control Centre, Park Road, Hanley. Salary £719 to £750 per annum (N.J.B. Class "K," Grade 10). The successful applicant will be responsible to the Sub-Area Senior Assistant Engineer (Operations and Technical) for operating, and for directing and supervising Districts and Sub-Area staffs in the operation of, the Sub-Area Transmission and Distribution System, and his duties will include those usual to a Common Service Control Centre. Applicants should have a good knowledge of System Operation and loading. Experience in generation and in the operation of Supervisory Controlled Substations would be an advantage.

Apply in writing within 14 days to: Sub-Area Manager, Midlands Electricity Board, 31 Kingsway, Stoke-on-Trent.

FIRST ASSISTANT DISTRICT ENGINEER
(Stone District) North Staffs. Sub-Area.

Experience necessary in all branches of distribution work including the operation and maintenance of H.V. and L.V. underground and overhead distribution systems. Technical qualifications desirable. Salary £714 to £731 per annum (N.J.B. Class "D," Grade 5).

Apply in writing within 14 days stating age, experience and present position to: Sub-Area Manager, Midlands Electricity Board, 31 Kingsway, Stoke-on-Trent.

GENERAL ASSISTANT DISTRICT ENGINEER
(Gloucester District) Central Gloucestershire
Sub-Area.

Experience necessary in all branches of distribution work, including the operation and maintenance of high and low voltage, underground and overhead distribution systems. Technical qualifications desirable. Salary £524 to £540 per annum (N.J.B. Class "E," Grade 11).

Apply in writing within 14 days, stating age, experience, present salary and position and quoting reference T/168 to: Sub-Area Manager, Midlands Electricity Board, 126 London Road, Gloucester.

JUNIOR ENGINEER

Shropshire and Herefordshire Sub-Area Headquarters. Technical qualifications desirable. Salary £390 per annum (N.J.B. Class "G," Grade 16).

Apply in writing within 14 days, stating age, experience and present position to: Sub-Area Manager, Midlands Electricity Board, Spring Gardens, Ditherington, Shrewsbury.

A. STEPHENS,
Secretary.
(E 461)

BRITISH ELECTRICITY AUTHORITY

South East Scotland Division

REQUIRED, ASSISTANT MAINTENANCE ENGINEER (MECHANICAL) at Portobello Power Station. Salary £717 to £746 (N.J.B. Class "H/6") with pension scheme.

Applicants should have wide experience in the operation and maintenance of a modern power station with water tube boilers. Good technical qualifications combined with sound practical training essential.

Applications by August 15, 1953, to Divisional Controller, British Electricity House, Portobello, Midlothian. (E 450)

SOUTH WALES ELECTRICITY BOARD

REQUIRED, a GENERAL ASSISTANT (Substations) in the Eastern Sub-Area of the Board at Cwmbran.

Applicants should have had experience in the construction, commissioning and maintenance of all classes of substations.

Salary in accordance with Class "J," Grade 13 (£552/£563/£573) of N.J.B. Schedule.

Applications stating age, present position and salary, qualifications and experience, and giving three referees, to be addressed to the Secretary to arrive by August 1, 1953.

D. G. DODDS,
Secretary.

St. Mellons, Cardiff. (E 457)

BRITISH ELECTRICITY AUTHORITY

Midlands Division

ASSISTANT SHIFT CHARGE ENGINEER is required at Ironbridge Power Station, Salop. N.J.B. service conditions, superannuable appointment, salary within Schedule "A," Grade H9, commencing at £680 per annum.

Higher National Certificate in electrical and/or mechanical engineering required, together with sound experience in the operation and maintenance of boilers, turbines and e.h.t. switchgear.

Apply on forms available from the Establishments Officer, 53 Wake Green Road, Moseley, Birmingham 13, or on Form AE6, by August 8, 1953. (E 445)

COUNTY BOROUGH OF DONCASTER

Works Department

AMENDED ADVERTISEMENT

APPLICATIONS are invited for the position of ELECTRICAL ASSISTANT in the above Department at a salary in accordance with Grade A.P.T. VII of the National Scales of Salaries (£710 rising to £785).

Candidates must have had practical experience of domestic and industrial installation work and be capable of preparing estimates and specifications and supervising the carrying out of electrical installations and maintenance work in municipal buildings, works, schools and new housing schemes.

Candidates should also have had experience of street lighting work and will be responsible, under the Borough Surveyor, for works of installation and maintenance of street lighting both electricity and gas.

Education standard should be equivalent to matriculation, and applicants should possess the Higher National Certificate in Electrical Engineering.

Written applications, stating age, education, qualifications and full details of experience, accompanied by copies of two recent testimonials and disclosing in their application whether to their knowledge they are related to any member of, or the holder of any senior office of, the Council, should reach the undersigned not later than Saturday, August 22, 1953.

H. R. WORMALD,
Town Clerk.

Town Clerk's Office,
1 Priory Place, Doncaster.
July 20, 1953. (E 464)

SOUTH WALES ELECTRICITY BOARD

REQUIRED, two GENERAL ASSISTANTS (Construction) in the Eastern Sub-Area of the Board of Cwmbran.

Applicants should have had a regular engineering training and have experience of mains construction work both overhead and underground.

Salary in accordance with Class "J," Grade 13 (£552/£563/£573) of N.J.B. Schedule.

Applications stating age, present position and salary, qualifications and experience, and giving three referees, to be addressed to the Secretary to arrive by August 1, 1953.

D. G. DODDS,
Secretary.
St. Mellons, Cardiff. (E 458)

MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD

Birkenhead District

ASSISTANT SECTION ENGINEER required in the Birkenhead District. Salary £573 to £596 per annum (N.J.B. G.11).

Applicants should have received a thorough training and practical experience in the operation and maintenance of e.h.v., m.v. and l.v. overhead and underground distribution network, including substations, and be in possession of the Higher National Certificate in Electrical Engineering.

Applications, on forms obtainable by written request from the Manager, No. 3 Sub-Area, Electricity House, Newgate Street, Chester, should be returned to him not later than July 31, 1953. (E 417)

BRITISH ELECTRICITY AUTHORITY

South Wales Division

Vacancy No. 60/53.

APPLICATIONS invited for superannuable N.J.B. appointment of FIRST ASSISTANT STATION CHEMIST, Carmarthen Bay Power Station, near Burry Port. Salary: "K.9," £766 to £796 per annum.

Degree in chemistry or equivalent and experience in water treatment, coal and oil testing and corrosion problems desirable.

Application forms obtainable from Secretary, South Wales Division, British Electricity Authority, Twyn-y-Fedwen Road, Gabalfa, Cardiff, should be returned by August 12, 1953. (E 426)

BRITISH ELECTRICITY AUTHORITY

North Western Division

DRAUGHTSMEN (Mechanical) and Draughtsmen (Electrical) required at Generation Construction Drawing Office, Agecroft, near Manchester. Applicants should have had experience of (a) the layout of generating stations or general mechanical engineering, or (b) cable layouts and electrical diagrams. Salary, depending on qualifications and experience, in range £433 to £567 or £567 to £671 (N.J.B. Schedule "D," Grade 6 or 5).

Apply to Establishments Officer, British Electricity House, 825 Wilmslow Road, Manchester 20, before August 5. Quote Vacancy No. 166/53. (E 438)

BRITISH ELECTRICITY AUTHORITY

Midlands Division

APPLICATIONS are invited for the position of EDUCATION AND TRAINING OFFICER in the Secretary's Department at Divisional Headquarters. Applicants should have had an extensive experience in training matters and should be capable of organising and administering training schemes for manual, technical and administrative staffs at all levels.

The salary for the appointment, which is superannuable, will be within the range of Grade 8 of the National Joint Council Agreement, £865 to £970 p.a.

Applications stating age, present salary and giving full details of qualifications and experience, should be sent to the undersigned at 53, Wake Green Road, Moseley, Birmingham 13.

The closing date for the receipt of the applications is August 8, 1953.

H. N. WILSON,
Divisional Secretary
(E 448)

BRITISH ELECTRICITY AUTHORITY

Eastern Division

APPLICATIONS are invited for the following post:—
MAINTENANCE ENGINEER (ELECTRICAL)
Little Barford Generating Station.

Salary: Class "G," Grade 6, £787 to £818 per annum.

Applicants should preferably be Corporate Members of the Institution of Electrical Engineers or possess an equivalent qualification. Experience in the maintenance of the electrical equipment in a modern generating station is essential.

Applications stating age, qualifications and experience should be sent to the Divisional Controller, British Electricity Authority, Eastern Division, Northmet House, Southgate, N.14, by August 6, 1953.

W. N. C. CLINCH,
Controller.
(E 441)

BRITISH ELECTRICITY AUTHORITY

London Division

THIRD ASSISTANT ENGINEER (MECHANICAL)
Generation Construction Department

APPLICATIONS are invited for the above superannuable post. Qualifications entitling to Grad. Membership of I.Mech.E. necessary with experience in Generating Station layout practice, preparation of plant specifications and handling of plant contracts, etc. Salary and conditions of service in accordance with N.J.B. Agreement, Schedule "C," Class "AX," Grade 5—£681 9s./£829 10s., rising to £927 3s. p.a., including London Allowance.

Application may be made on form obtainable from Divisional Secretary, B.E.A., London Division, Generation House, Great Portland Street, W.1, and be received within 14 days of this advertisement. (E 459)

A NUMBER of young men with some drawing office experience are required for vacancies with the Traction Dept. of B.I.C. Construction Co. at Kirkby, nr. Liverpool. Candidates need not be qualified draughtsmen for this type of work which entails layout and general arrangements of o.h. wiring and supporting structures associated with railway electrification contracts. There is every opportunity of progression and the appointments are to the permanent staff, after the usual probationary period.—Applications should be forwarded in writing in the first place to The Staff Officer, B.I.C.C., Ltd., Prescot, Lancs. (E 431)

ASSISTANT MANAGER required in the Industrial Heating and Cooking Sales Dept., at our Blythe Bridge Factory. The successful applicant will be required to reside in the vicinity of Blythe Bridge.—Applications, which will be treated in strict confidence, should state age, qualifications, previous experience and salary required, and be addressed to the Manager, Industrial Heating and Cooking Sales Dept., Simplex Electric Co. Ltd., Grindley Lane, Blythe Bridge, near Stoke-on-Trent, marking the envelope "Private." (E 436)

ASSISTANT MECHANICAL ENGINEER required for service at a power station during construction. Applicants should have served a recognised apprenticeship, and have a mechanical engineering qualification. Experience on the construction of mechanical plant outside works would be an advantage.—Applications, stating salary required and giving full details of experience and qualifications, should be addressed to the Secretary, Ewbank and Partners, Ltd., Engineering Consultants, 10-11 Grosvenor Place, London, S.W.1. (E 427)

BOX No. replies to be addressed to the ELECTRICAL TIMES, Sardinia House, Sardinia Street, London W.C.2

ALKALINE BATTERIES LTD.,
of Redditch

are the makers of the well-known NIFE nickel cadmium alkaline accumulators, miners' lamps, portable lighting and all kinds of emergency lighting and standby power systems, products which have a wide and growing usage throughout industry, and particularly for export.

THE COMPANY HAS VACANCIES
in its sales engineering departments for

QUALIFIED ELECTRICAL ENGINEERS

for post graduate training and applications are invited from men who either have a Degree in Electrical Engineering, or are nearing the end of their Degree course, and have completed National Service. Applicants must be prepared to reside in any part of the country, or abroad, and must have a keen interest in the sales development side of an engineering product.

IN ADDITION

to the vacancies for post graduate training, there are a limited number of vacancies for

QUALIFIED ELECTRICAL ENGINEERS

not over 30 years of age, who already have outside sales experience.

The posts are pensionable and progressive, and offer the prospect of executive rank in the company's organisation.

Applications, giving full educational details and experience, if any, should be addressed:—

Commercial Manager,

ALKALINE BATTERIES LTD.,

Union Street, Redditch, Worcs. (E 409p)

BRITISH ELECTRICITY AUTHORITY, Drawing Office, Headquarters Bankside, London, require:—
SENIOR DRAUGHTSMEN (Grade 4 and 5), and DRAUGHTSMEN (Grade 6). Candidates should have experience in power station layout or have been employed in a power station drawing office.
SENIOR DRAUGHTSMEN (Grade 5) with experience in R.C. design and detail for light structures and foundations required for main grid sub-stations.
ELECTRICAL DRAUGHTSMEN (Grade 6). Starting salaries will be in accordance with qualifications and experience as follows: N.J.B. Grade 4, £705 to £819; Grade 5, £595 to £705; Grade 6, £458 to £595. Pension scheme. Canteen. One Saturday morning in four on duty.
Forms from D. Moffat, Director of Establishments, Winsley Street, London, W.1. Quote Ref. E.T./397. (E 416)

BRITISH ELECTRICITY AUTHORITY require JUNIOR SCIENTIFIC STAFF at the Research Laboratories at Leatherhead and Croydon. Candidates should have a Higher National Certificate or equivalent qualification in electrical or mechanical engineering or in physics. Duties include testing, development and research work in the laboratories and in the field in connection with generation transmission and distribution of electricity. Salary N.J.B. Grade 6 (Junior Engineer), £390 to £606 plus London Allowance at Croydon.—Forms from D. Moffat, Director of Establishments, Winsley Street, London, W.1, to be returned by August 10, 1953. Quote Ref. E.T./398. (E 418)

BRITISH ELECTRICITY AUTHORITY require SENIOR ASSISTANT (COMMITTEE CLERK) at Headquarters in London for the National Joint Advisory Council of the Electricity Supply Industry. Candidates must be interested in Joint Consultation in Industry, and should preferably have experience of committee work, including the drafting of Agenda and Minutes. Salary, Grade 4, N.J.C., £610 to £672 inclusive. Pension Scheme.—Applications to D. Moffat, Director of Establishments, Winsley Street, London W.1, by August 10, 1953. Quote reference AE/400. (E 402)

CONTRACT ENGINEERING appointments are available with the English Electric Co., Ltd., on important work covering all classes of electrical equipment. These appointments are pensionable after a qualifying period and apprentice-trained men with Higher National Certificate in electrical or mechanical engineering or equivalent and with previous experience on contract work are required.
Experience in the manufacturing or power supply industries or in the application or installation of electrical equipment in any branch of industry or engineering is an alternative qualification and professional engineers in these fields are also invited to apply.
A number of vacancies also exist for apprentice-trained engineers who have not yet had any opportunity of acquiring contract experience.
Apply to Dept. C.P.S., 338-7 Strand, W.C.2, quoting Ref. SA33. (E 434)

CABLE GANGER required for the Middle East, experienced in the handling of labour, drawing in of paper insulated armoured cables, etc., and capable of handling heavy lifts.—Apply, stating age and experience, forward copies of testimonials or names to whom we may apply, to Box No. 2795, Electrical Times. (E 354)

CABLE making. MATERIAL CONTROL OFFICER required. Primary duty to ensure correct consumption of raw materials and minimum of scrap in manufacture. Knowledge of power cable manufacture an advantage. Eng. degree or H.N.C. standard essential. Good salary and prospects. Pension fund, etc.—Apply: Staff Officer, B.I.C.C., Ltd., Belvedere, Kent. (E 424)

CONTROL GEAR DESIGNERS required for manufacturers in South Midlands. Applicants should have knowledge of motor and machine characteristics and some control gear experience. Salary depending upon qualifications. Staff pension scheme in operation.—Reply giving full details of training and experience to Box No. 2811, Electrical Times. (E 435)

DESIGN DRAUGHTSMEN required, experienced in power station plant layout and/or h.p. and l.p. pipework arrangements. Salaries according age and experience.—Apply in writing to Preece, Cardew and Rider, Consulting Engineers, 28 and 10 Queen Anne's Gate, Westminster, London S.W.1. (E 419)

DRAUGHTSMEN. British Insulated Callender's Cables Ltd. have vacancies for draughtsmen in their Mechanical Engineering Division at Prescot, for design and detail work. Candidates should have mechanical experience and training to a minimum of O.N.C. standard, and some electrical knowledge would be an advantage. Permanent status after usual probationary service, with superannuation and bonus schemes. Remuneration will be assessed according to age, experience and qualifications.—Applications in writing should be addressed to Staff Officer, B.I.C.C., Ltd., Prescot, Lancs. (E 430)

ELECTRICAL (B.T.H. trained man preferred) or MECHANICAL ENGINEER/SALESMAN required for the Far East. Should hold Higher National Certificate or engineering degree. Bachelor not over 25. Salary according to experience, plus cost-of-living allowance. Passage and furnished accommodation provided. Provident fund, pension scheme.—Apply Staff Secretary, The Borneo Co., Ltd., 143-149 Fenchurch Street, London E.C.3. (E 426)

ELECTRICAL ENGINEERING DRAUGHTSMAN required by Tees-side firm of engineers for the power and lighting installations of their various contracts. The work will include the preparation of control schemes and wiring diagrams and contract requisitioning of equipment.—Apply stating age, experience and qualifications to Box No. 2809, Electrical Times. (E 423)

ELECTRICAL ENGINEER required for design and development. F.H.P. Motors for aircraft fuel system accessories. Main qualification Higher National Certificate, electrical engineering. Practical experience of winding and diagnosis of motors desirable. Required to supervise and carry out test work on prototypes, and advise on production problems.—Write stating age, training and salary required to Self-Priming Pump and Engineering Co., Ltd., Trading Estate, Slough, Bucks. (E 433)

ELECTRICAL TEST ENGINEER required. Experienced motors, wiring, circuits, installation and testing armaments, fire direction control or similar units. Good technical and theoretical background. Old-established large organisation Medway area.—Write full details to Box E.T. 516, c/o 191 Gresham House, E.C.2. (E 403)

ENGINEERS, electrical, electro-mechanical, mechanical and metallurgical, required for research, development and test work in laboratory dealing with aeronautical and guided weapons problems.—Apply to Employment Manager, Vickers-Armstrongs, Ltd. (Aircraft Section), Weybridge, Surrey. (E 307)

LABORATORY ENGINEER. H.N.C. or equivalent. Experience relays and magnetic amplifiers. Housing and pension scheme available.—Apply Personnel Manager, Electro Methods, Ltd. Caxton Way, Stevenage, Herts. (E 440)

LEGG (Industries), LTD., require a SALES ENGINEER to act as sole Representative in the London area. Previous experience is essential in the field covering the application of metal rectifying equipment and medium-size transformers.—Replies, which will be treated in strict confidence, stating age, qualifications and salary required, should be addressed to the Managing Director, Legg (Industries), Ltd., Williamson Street, Wolverhampton, Staffs. (E 406)

Engagement of persons must be made through a Local Labour Office or Scheduled Employment Agency, if the applicant is a man aged 18-64, or a woman aged 18-59; unless the person concerned is excepted or the employment is in a managerial or professional capacity, or is otherwise excepted from the provisions of the Notification of Vacancies Order, 1952.

MECHANICAL DRAUGHTSMAN required for small Site Drawing Office in Kuwait, Persian Gulf. Applicants, not over 35 years of age, should have experience in general power station design and have served a regular mechanical engineering apprenticeship. The starting salary will be £875 per annum, plus a cost-of-living allowance. Married accommodation cannot be promised under 12 months.—Applications, giving full details of experience, should be addressed to the Secretary, Ewbank and Partners, Ltd., Engineering Consultants, 10-11 Grosvenor Place, London, S.W.1. (E 439)

PIRELLI-GENERAL CABLE WORKS LTD. invite applications for Steel Tower Transmission Line ENGINEER/SURVEYOR.—Write, giving full particulars of experience and salary expected to Overhead Lines Department, Eastleigh, Hants. (E 289)

PLUMBER JOINTER for Middle East, experienced in jointing paper cables, lead covered and armoured up to 11 kV.—Apply, stating age and experience, forward copies of testimonials, or state names to whom we may apply, to Box No. 2797, Electrical Times. (E 355)

PUBLICITY ENGINEER wanted by makers of power transformers and power capacitors. Bonus and pension schemes in operation. Salary according to qualifications.—Apply: Bryce Electric Construction Co., Ltd., Kelvin Works, Hackbridge, Wallington, Surrey. (E 364)

RADAR TEST ENGINEER fully experienced required. Full responsibility adjustment, testing and installation complete short range marine radar sets. Old-established large organisation Medway area.—Write full details and salary to Box E.T.517, c/o 191 Gresham House, E.C.2. (E 404)

SALES ENGINEER, with electrical and mechanical experience, required by well-known engineering firm, Newcastle-on-Tyne.—Box No. 2769, Electrical Times. (E 292)

SHIFT CHARGE ENGINEER for electricity supply undertaking in Bagdad. Applications are invited from suitably qualified Engineers, preferably between 25 and 35 years of age, who have had experience in the operation of a power station of at least 15,000 kW, with medium pressure boilers. Salary £1,000 to £1,200 per annum, plus high cost of living allowance. Free house with heavy furniture will be supplied or a monthly house allowance of £12 in lieu. Three-year contract, renewable, with first-class passage each way for successful applicant and family (if married). Three months' leave on full pay in U.K. on completion of 24 consecutive months in Iraq, first-class leave passages being paid.—Box No. 2807, Electrical Times. (E 413)

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INDEX TO ADVERTISERS

Alton Battery Co., Ltd.... ... 63
Arrow Electric Switches, Ltd. ... 70
Association of Steel Conduit Manufacturers 73
Auchterlonie, Chas., & Co., Ltd. 66
Belling & Co., Ltd. 6
Belmos Company, Ltd. 36
Bill Switchgear, Ltd. 5
Birch, H. A., & Co., Ltd.... ... 21
Bridgens, Arthur, Ltd. 72
British Insulated Callender's Cables, Ltd. 1
British National Electrics, Ltd.... 35
British Power Transformer Co., Ltd.... 64
British Thomson-Houston Co., Ltd. 69
Brush Electrical Engineering Co., Ltd. 14
B.V.C. Industrial Constructions, Ltd. 54
Carter, B. & F. & Co., Ltd. ... 68
Chance Bros., Ltd. 68
Clyde Blowers, Ltd. 66
Connolly's (Blackley), Ltd. ... 24
Cressall Manufacturing Co., Ltd. 4
Crompton Parkinson, Ltd. ... 26
Drake & Gorham Wholesale, Ltd. 4
Edison Swan Electric Co., Ltd.... 38
Electrical Devices Co., Ltd. ... 68
Electro Methods, Ltd. 15
Engineering & Lighting Equipment Co., Ltd.... 74
English Electric Co., Ltd. ... 7
Erskine, Heap & Co., Ltd. ... 8
Falk Stadelmann & Co., Ltd. ... 37
Ferranti, Ltd. 30
Ferranti, Denis, Co., Ltd. ... 76
Fry's Metal Foundries, Ltd. ... 40
Geipel, Wm., Ltd. 72
General Cable Manufacturing Co., Ltd. 22
General Electric Co., Ltd. ... 23
Genristo, Ltd. 64
Gilflex Conduits, Ltd. 76
Glover, W.T., & Co., Ltd. ... 75
G.M. Engineering (Ottery St. Mary), Ltd. 61
Hackbridge & Hewittic Electric Co., Ltd. 43
Henley's W.T. Telegraph Works Co., Ltd. 13
Holophane, Ltd. 25
Hoover, Ltd. 42
Horstmann Gear Co., Ltd. ... 62
Igranic Electric Co., Ltd. ... 53
International Combustion, Ltd. 27
Johnson & Phillips, Ltd.... ... 2
Kempston Electrical Co., Ltd. ... 66
Laurence, Scott & Electromotors, Ltd. 3
Lewis Spring Co.... 16
Lindley Thompson Transformer and Service Co., Ltd. 11
Londex, Ltd. 10
L.P.S. Electrical Co., Ltd. ... 10
Marryat & Place, Ltd. 70
Martindale Electric Co., Ltd. ... 52
Mersey Cable Works, Ltd. ... 28
Metropolitan-Vickers Electrical Co., Ltd. 29, 44
Metway Electrical Industries, Ltd. 4
Micanite & Insulators Co., Ltd.... 9
M.K. Electric, Ltd. 33
Nettle Accessories, Ltd. ... 12
Northern Automatic Screw Co., Ltd. 66
Nu-Swift Ltd. 51
Philips Electrical, Ltd. 55
Phillips Control (G.B.), Ltd. ... 70
Pilkington Bros., Ltd. 65
Pinchin, Johnson & Co. 58
Pye, W. G., & Co., Ltd. 56
Revo Electric Co., Ltd. 67
Ross Courtney & Co., Ltd. ... 16
Rotunda, Ltd. 72
Sanders, William, & Co. (Wednesbury), Ltd. 31
Shell Mex & B.P., Ltd. 57
Siemens Electric Lamps & Supplies, Ltd. 32
Simmonds & Stokes (Niphan), Ltd. 58
Spencer Wire Co., Ltd. 60
Sperryn & Co., Ltd. 62
Standard Telephones & Cables, Ltd. 34
Statter, J. G., & Co., Ltd. ... 70
Sterling Cable Co. 39
Symonds, R. H., Ltd. 17
Synthetic Carbon & Engineering Co., Ltd. 70
Transformer & Electrical Co., Ltd. 68
United Ebonite & Lorival, Ltd. 59
Universal Boilers & Engineering Co., Ltd. 18
U.S. Metallic Packing Co., Ltd. 72
Venner, Ltd. 19
Volex Electrical Products, Ltd.... 71
Waverley Book Co., Ltd. ... 20
Wootton & Co., Ltd. 56
Zenith Electric Co., Ltd. ... 60

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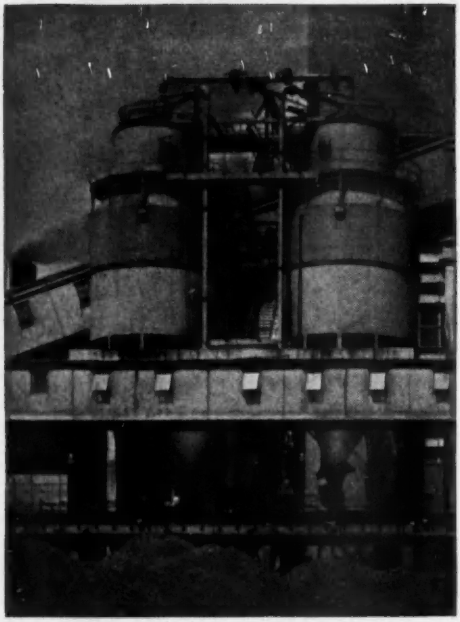

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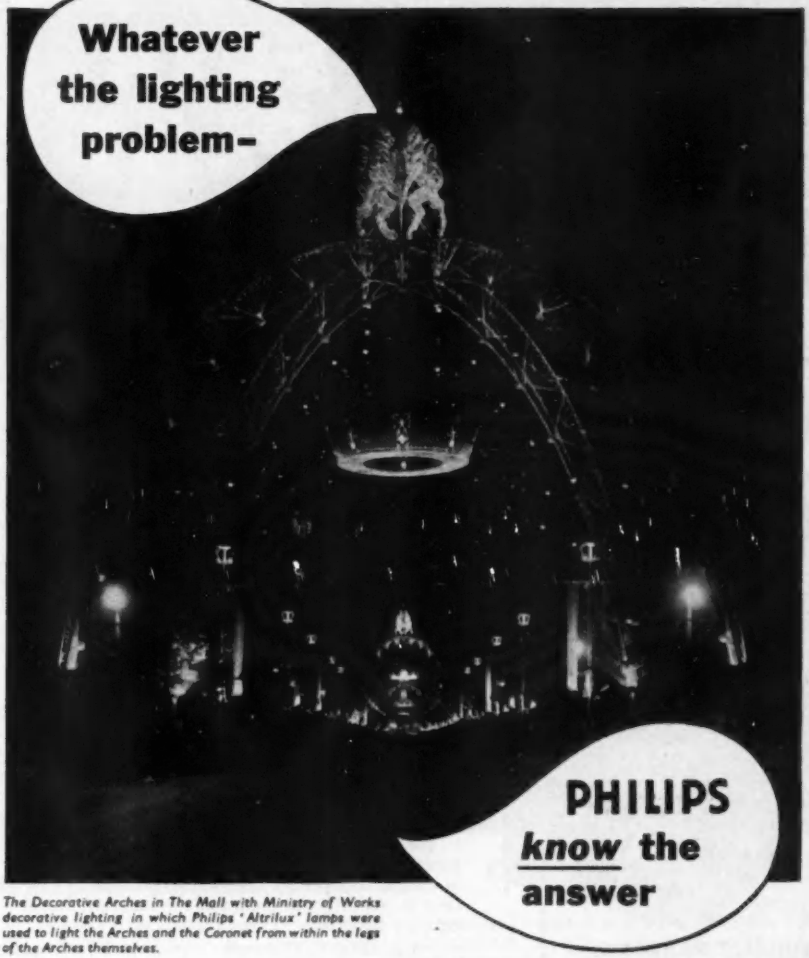

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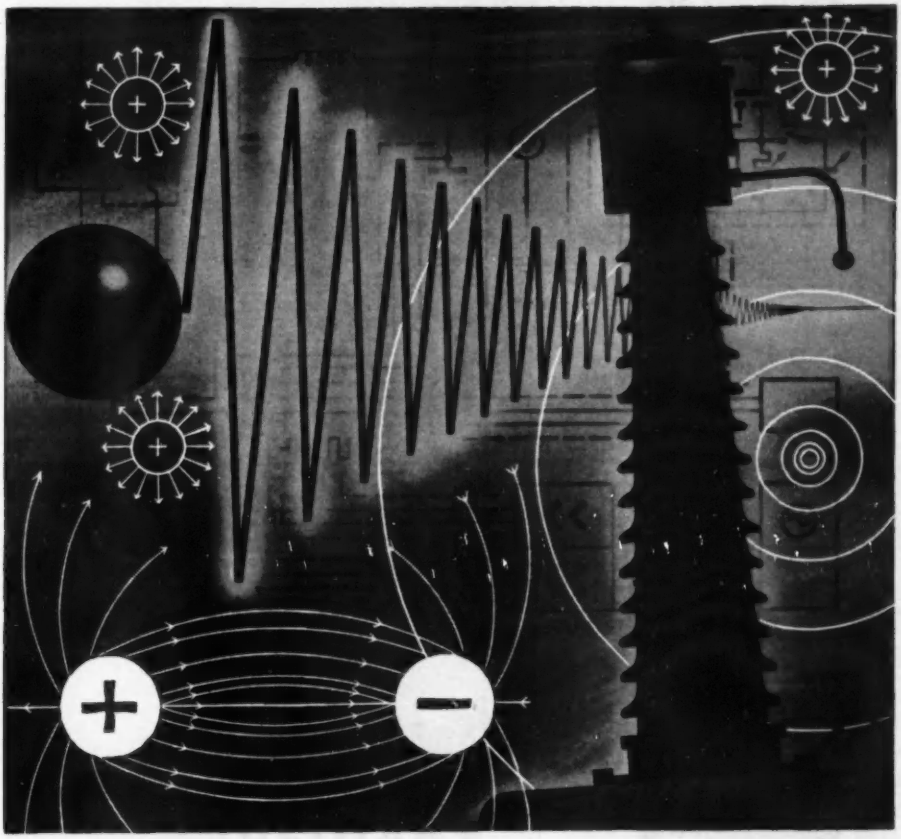

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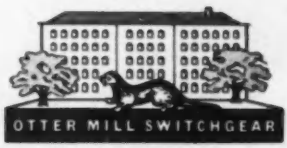

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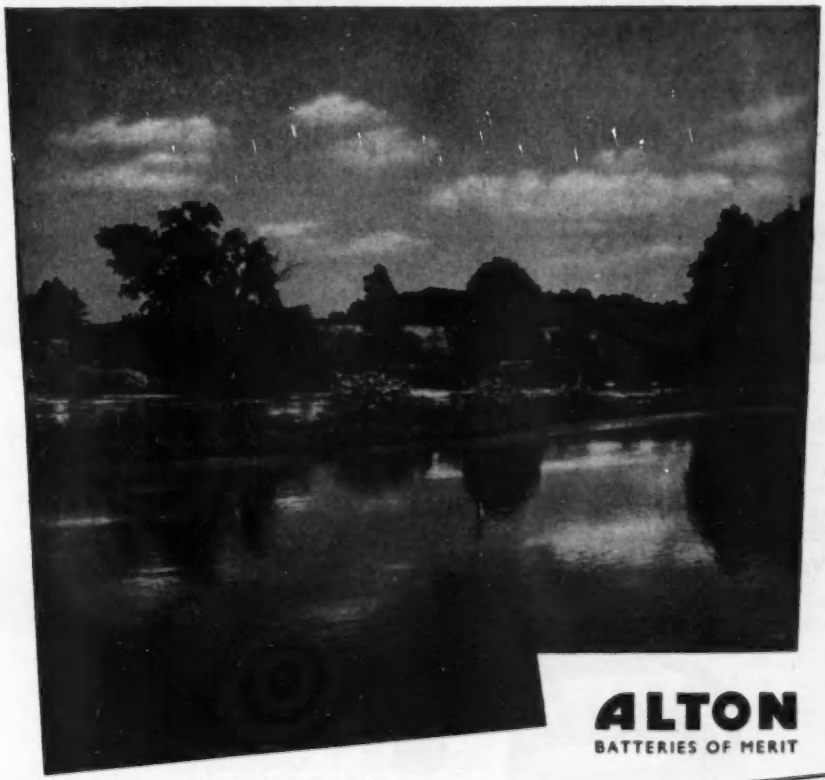

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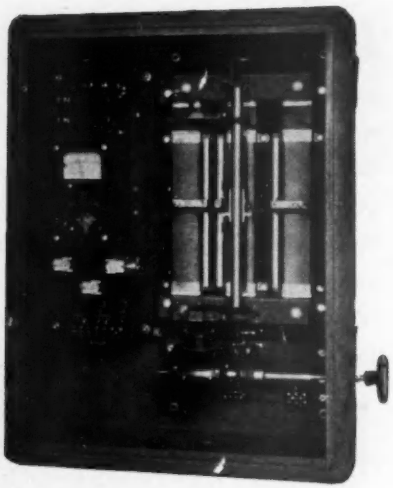

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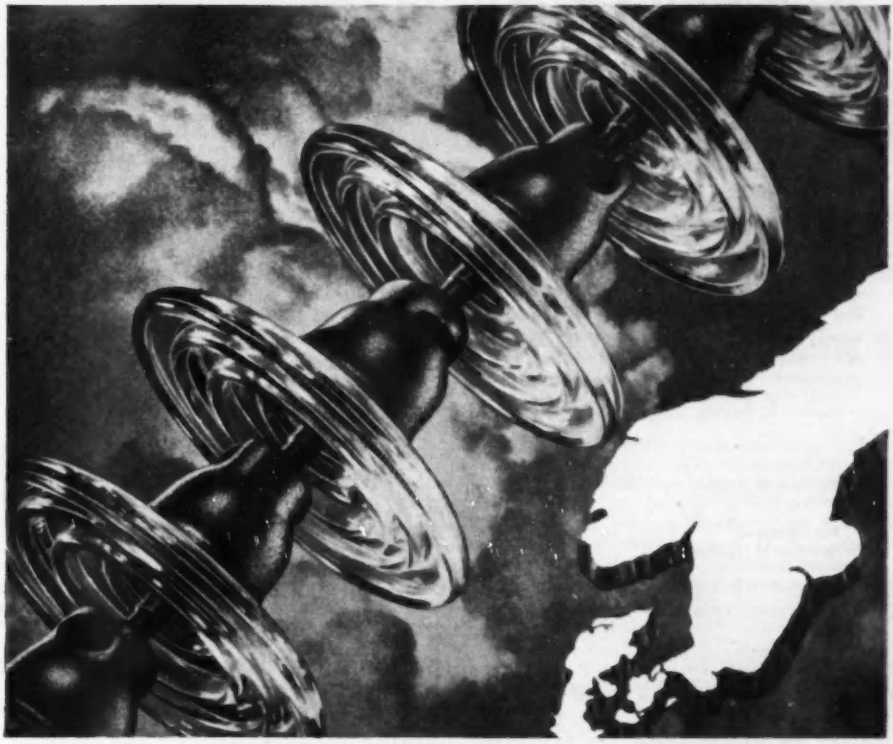

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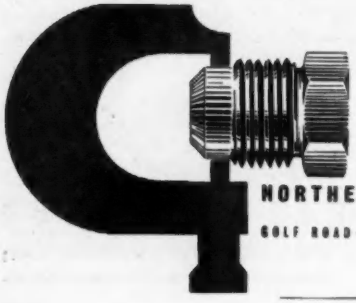

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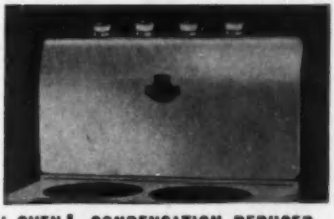

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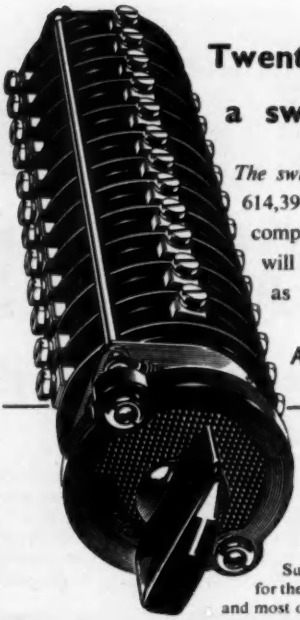

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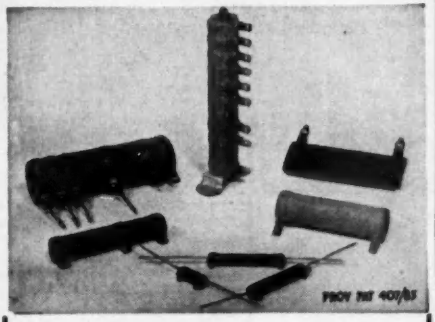

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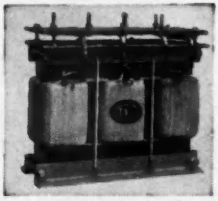

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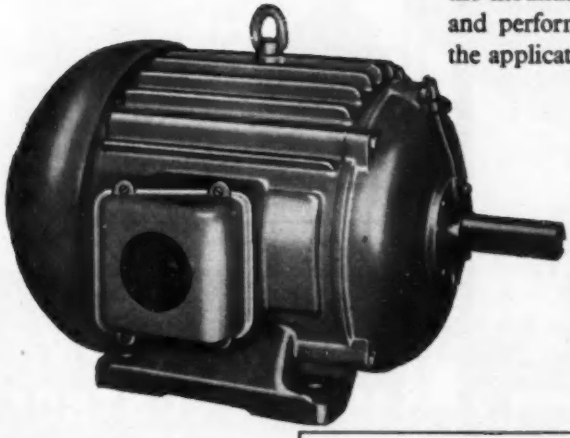

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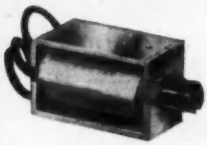

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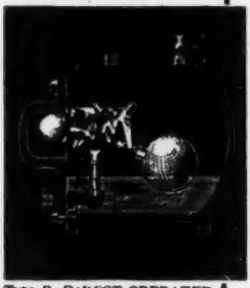

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